

Dr. Amit Goyal, Ph.D, MBA

Fellow NAI¹, MRS², AAAS³, APS⁴, WIF⁵, ASM⁶, IOP⁷, ACERS⁸, WTN⁹
Director, RENEW

Empire Innovation Professor

State University of New York @ Buffalo (SUNY-Buffalo)

Work Address

State University of New York
Cooke 112
Buffalo, NY 14221
Tel: 865-300-4202
Email: agoyal@buffalo.edu

Home Address

68 Dante CT.
Williamsville, NY 14221
Tel: 865-300-4202
Email: goyal350@yahoo.com

Employment History

1/2015- **Director, RENEW**^{10,11}, SUNY-Buffalo.
1/2015- **Empire Innovation Professor** in four departments at SUNY-Buffalo – Chemical Biological Engineering, Electrical Engineering, Physics and the department of Materials Design & Innovation (with full tenure).
1/2015- **Emeritus Corporate Fellow**, Oak Ridge National Laboratory.
8/2010- **President & CEO**, TapeSolar Inc., a private-equity funded, solar company.
8/2010- **President & CEO**, TexMat LLC., an IP holding company.
2010-14 **Chair**, ORNL Corporate Fellows Council, UT-Battelle Inc.
2009-10 **Vice-Chair**, ORNL Corporate Fellows Council, UT-Battelle Inc. Oak Ridge National Laboratory, Oak Ridge, TN.
2008-14 **UT-Battelle/ORNL Corporate Fellow**. Oak Ridge National Laboratory, Oak Ridge, TN.
2007-11 **Wire Research Co-ordinator and Task Leader**, HTS Materials Projects, Oak Ridge National Laboratory, Oak Ridge, TN.
2004-08 **ORNL Distinguished Scientist**, Oak Ridge National Laboratory.
2004-07 **Task Manager**, Superconducting Materials Research, Metals & Ceramics Division, Oak Ridge National Laboratory, Oak Ridge, TN.
2004-07 **Team Leader**, Superconducting Materials, Functional Materials, Metals & Ceramics Division, Oak Ridge National Laboratory.
2003- **Battelle Distinguished Inventor**, Columbus, Ohio.
2000-04 **Senior Scientist**, ORNL/UT-Battelle, Oak Ridge, TN.
1997-00 **Materials Scientist**, Lockheed-Martin Energy Research, Oak Ridge, TN.
1993-97 **Staff Scientist**, Oak Ridge National Laboratory, TN.
1991-93 **Fellow**, Oak Ridge Institute of Science & Technology, TN.
1988-91 **Fellow**, University of Rochester, Rochester, NY.

¹ NAI = National Academy of Inventors

² MRS = Materials Research Society, www.mrs.org.

³ AAAS = American Association for Advancement of Science, <http://www.aaas.org/>.

⁴ APS = American Physical Society, <http://www.aps.org/>.

⁵ WIF = World Innovation Foundation, <http://www.thewif.org.uk/>.

⁶ ASM = American Society of Metals. <http://www.asminternational.org/>.

⁷ IOP = Institute of Physics, <http://www.iop.org/>.

⁸ ACERS = American ceramic Society, <http://www.acers.org/>.

⁹ WTN = World Technology Network, <http://www.wtn.net/>.

¹⁰ <http://www.buffalo.edu/news/releases/2014/12/035.html>

¹¹ <http://www.buffalo.edu/renew>

<p>Educational Training</p>	<p>2005 “Managing Technical Professionals and Organizations”¹², MIT’s Sloan School of Management. March 31-April 1, 2005. Executive Series on Management, Innovation and Technology.</p> <p>2001-02 Executive Masters in Business Administration (MBA)¹³, Krannert School of Management, Purdue University, West Lafayette, IN.</p> <p>2001-02 Executive Masters in International Business Administration (MBA)⁹, Tilburg University, The Netherlands.</p> <p>1988-91 Ph.D. in Materials Science & Engineering, Univ. of Rochester, NY.</p> <p>1986-88 M.S. in Mech. & Aerospace Engineering, Univ. of Rochester, NY.</p> <p>1982-86 B.Tech. in Metallurgical Engineering, Indian Institute of Technology, India.</p>
<p>Management Experience</p>	<ul style="list-style-type: none"> • Director RENEW (January 2015-date): One of the most <i>expansive</i> initiatives launched by SUNY-Buffalo or UB in recent years, RENEW (Research and Education in eEnergy, Environment and Water) is an interdisciplinary institute that harnesses the expertise of more than 100 faculty members across seven schools and colleges and will hire 20 more faculty. RENEW is a model for UB’s Communities of Excellence initiative — under the UB 2020 strategic plan — that brings together researchers from across the university to address society’s toughest challenges and carry out transformative educational, research, creative and community engagement activities. RENEW involves the faculties at seven schools and colleges at the university including the School of Architecture and Planning, College of Arts and Sciences, School of Engineering and Applied Sciences, Law School, School of Management and School of Public Health and Health Professions and the School of Medicine. More information can be found at http://www.buffalo.edu/renew. • President & CEO and Financial Head (2010-date): Experience as senior administrator of two companies (TapeSolar Inc. and TexMat LLC) and responsible for all administrative and financial functions. Experience with entrepreneurship and startup of new entities. Experience in interacting with private equity firms such as venture capital firms and angel investors. TapeSolar Inc. is a private equity investment funded company with offices San Marcos, TX. TapeSolar is developing the next generation photovoltaic technology. TexMat LLC is an IP holding company. • Chair of the Corporate Fellows Council (2009-2014): Advised ORNL senior management on specific scientific and technological issues and opportunities, served as a channel for communication between ORNL scientific and technical staff and ORNL senior management and articulated ideas and concerns of the ORNL scientific and technical staff regarding objectives and directions of the Laboratory. Corporate fellows are a select group of highly accomplished individuals and characterize innovation, dedication, and significance of extraordinary contributions to research and development at Oak Ridge National Laboratory / UT-Battelle. • Over twenty years project management and administrative experience (1993-2014): as principal investigator in managing technical projects of a diverse nature and involving multiple organizations. Over the years have worked as Principal

¹² This is an executive business program developed for senior management executives from private and public sector organizations involved with science & technology, including Chief Information Officers, Chief Technologists, Directors of R&D, Heads of Engineering, Vice Presidents of Engineering and Vice Presidents of Research. <http://mitsloan.mit.edu/execed/epp/courses/tech-professionals.php>

¹³ This executive program was a collaborative effort of the Krannert Graduate School of Management of Purdue University in the United States (rated 6th by the Wall Street Journal, 2001); Tias Business School of Tilburg University in the Netherlands (rated 3rd in Economics in Europe); the Budapest School of Management of the Budapest University of Economic Sciences and Public Administration (BUESPA) in Hungary (top school of economics and management in Eastern Europe); and ESCP-EAP European School of Management in Paris (Managed by the Chamber of Commerce, France), France. The program consisted of six concentrated two-week sessions interdispersed throughout a two-year long program period allowing participants (mainly senior executives) to maintain their job responsibilities while they acquire the broad range of managerial skills needed to be effective in today's and tomorrow's international business environment. A majority of the class was composed of Presidents, CEO's, CFO's and other senior executives from large companies worldwide.

	<p>Investigator / Overall Manager on projects with most major US companies with interests in HTS and electric power applications, including General Electric Corporation, 3M Corporation, Intermagnetics, American Superconductor Corporation, SuperPower Inc., Oxford Superconductivity, Southwire Cable Company, Westinghouse Science & Electric, Midwest Superconductivity, Microcoating Technologies, Jet Deposition Technologies, Illinois Superconductor, Plastronics and EURUS. Have served as Principal Investigator / Manager in projects with NanoSolar Inc., Global Solar Inc., Ampulse Inc. and Grid Logic. Experience in putting together large consortia proposals to funding agencies, the most recent being a \$50M consortia proposal involving ~ 20 organizations including 15 companies and several universities and national laboratories in two countries.</p> <ul style="list-style-type: none"> • <u>Superconducting Wire Research Co-Ordinator (2007-2011):</u> Provided overall research co-ordination of all HTS wire research projects at Oak Ridge National Laboratory funded by the Department of Energy’s Office of Electricity (OE) Program Office. At its peak, the HTS program at ORNL was ~ \$15-20M/year and involved 25-30 people including postdoctoral fellows and students. Significant experience in developing and building impenetrable intellectual property portfolios. Experience in working with and defending intellectual property in interference cases at the European Patent Office. • <u>Task Manager, Superconducting Materials Research, Metals & Ceramics Division (2004-2007):</u> Provided technical leadership, oversight, and coordination of all HTS materials research projects in the M&C Division funded by the DOE/OETD Superconductivity program. Coordinated M&C input to the Field Work Proposal and to the annual DOE peer review, as well as M&C input for DOE quarterly and annual reports. In partnership with program management, prioritized existing and proposed new 2G and strategic wire research projects in M&C Division and coordinated periodic internal progress report meetings. Coordinated M&C involvement in joint projects involving industry, universities, and/or other ORNL divisions. Managed 2G and strategic HTS materials research project budgets within the M&C HTS Materials Projects team, in consultation with program and divisional management. • <u>Task/Technical Leader, Superconducting Materials Team, Metals & Ceramics Division (2004-2007):</u> Provided technical leadership for all projects performed by the HTS Task team in the Functional Materials Group. Developed a research agenda for the task team, consistent with the goals, mission and strategic plan of the HTS program. Ensured communication among all members of the task team, and divisional management, on topics of interest, and issues of importance, via one-on-one meetings, task group meetings, emails etc. Addressed ES&H issues of importance at each task team meeting. Managed cost spending within available budgets. Mentored and guided task team members to grow professionally and set goals for task team members that will be challenging and will contribute to the goals of the task team, the group and the division. Managed space that is assigned to the task team. Maintained clean laboratories and compliant research equipment. Ensured maintenance of updated RSS’s to reflect all equipment and work of the respective task team laboratories. Maintained sufficient funding for the task team and its activities.
<p>Technology Focus</p>	<p>Significant expertise and experience in the following technical areas:</p> <ul style="list-style-type: none"> • Electronic materials in general and in particular high temperature superconducting materials • Photovoltaics – fabrication of low-cost, high efficiency solar cells • Ferroelectrics/dielectrics, high-density magnetic storage • Roll-to-roll deposition technologies including PVD, CVD and chemical solution deposition • Thin film and thick film growth of devices by physical vapor deposition, chemical vapor deposition and solution growth methods

	<ul style="list-style-type: none"> • Low-cost, single-crystal-like substrate technologies • Self-assembly of nanodots and nanorods of one phase within another, e.g. for pinning sites within a superconducting film (<i>Science</i>, 311, 1911-1914, 2006) • Self-assembly of nanofences containing single-crystal nanobelt segments • Controlled synthesis of aligned nanorods, etc. • Microstructure – Property – Processing at all length scales. • Materials science & engineering in general
<p style="text-align: center;">Awards of Excellence</p>	<p>Selected Awards:</p> <ul style="list-style-type: none"> • 2016 R&D100 Award for developing the technology titled “<i>Low-Cost, Flexible, Single-Crystal-Like, Large-Area, CdTe Substrates For Epitaxial Electronic & Electrical Devices</i>”. • 2015 Member, National Academy of Inventors. Elected Member and Fellow of the National Academy of Inventors, USA for “<i>having demonstrated a highly prolific spirit of innovation in creating or facilitating outstanding inventions that have made a tangible impact on quality of life, economic development and the welfare of society.</i>” Included among all NAI Members and Fellows are 61 presidents and senior leadership of research universities and non-profit research institutes, 208 members of the other National Academies (NAS, NAE, IOM), 21 inductees of the National Inventors Hall of Fame, 16 recipients of the U.S. National Medal of Technology and Innovation, 10 recipients of the U.S. National Medal of Science and 21 Nobel Laureates. • 2013 R&D100 Award for the technology titled “<i>Large-Area, Flexible, Single-Crystal-Like, GaAs Substrates For Epitaxial Electronic & Electrical Devices</i>”. • 2012 World Technology Award in the Category of “Materials”. The prestigious World Technology Awards are presented by the World Technology Network (WTN) in association with <i>Time, Fortune, CNN, Science/AAAS</i> and <i>MIT’s Technology Review Magazine</i> with a stated goal to recognize “<i>individuals and companies for innovations of the greatest long-term significance</i>” in their respective fields. Winners were announced in 10 corporate categories and 20 individual categories including the Arts, Biotechnology, Communications, Energy, Environment, Finance, Health & Medicine, IT, Materials, Law, Policy, Space, among others. The 2012 World Technology Awards were announced in a black-tie awards ceremony at the Time & Life Building in Manhattan, NYC on Oct. 23, 2012. <i>Other World Technology Award recipients in the category of Materials include Nobel Laureate Alan Heeger (2013) and in previous years George Whitesides, Frederick Seitz, Michael Graetzel, Charles Lieber and Angela Belcher.</i> • 2012 R&D100 Award for developing the technology titled “<i>Highest Pinning Force, High-Temperature Superconducting Wires with Double-Perovskite Tantalate Nano-Pinning Centers</i>”. • Fellow, MRS. Elected Fellow of the Materials Research Society, February 2012. The title of MRS Fellow honors those MRS members who are notable for their distinguished research accomplishments and their outstanding contributions to the advancement of materials research, world-wide. The maximum number of new Fellow appointments each year is limited to 0.2% of the current MRS membership. The distinction is highly selective. • 2011 DOE’s E. O. Lawrence Award for “Energy Science & Innovation”. The E. O. Lawrence award is awarded on behalf of the <i>President of the United States by the US Department of Energy Secretary</i> to outstanding scientists. This award in the inaugural category of <u>Energy Science and Innovation</u> recognizes transformative accomplishments related to DOE's investments in "use inspired" scientific research to develop new understanding, methodologies and materials required to advance, promote, and enable energy innovation. <i>The Ernest Orlando Lawrence Award was established in 1959 in honor of the Nobel winning scientist who helped elevate</i>

American physics to world leadership. He is the only Lawrence Award Winner that was invited by Secretary Chu to give a science lecture at USDOE (<http://www.osti.gov/sciencecinema/biblio/1043697>).

- **2011 National Federal Laboratory Consortium Excellence in Technology Transfer Award** for the technology titled – “*Flexible Thin-Film Crystalline-Silicon Photovoltaics*”.
- **2011 R&D100 Award** for developing the technology titled “*Ultra-high Density Storage Media*”. The product is the first report of successful fabrication of a 1 Tb/in² storage media made using a process of nanoscale self-assembly.
- **2010 R&D100 Magazine’s “Innovator of the Year” Award**: The “Innovator of the Year” Award is given for collective lifetime contributions. *Among the other 9 past recipients of this honor are Larry Page (co-founder of Google), Elon Musk (Inventor of PayPal, Tesla) and Dean Kaman (inventor of the Segway)*. Widely recognized as the “Oscars of invention”, the R&D100 awards are given to the most innovative products developed in any field world-wide in that calendar year.
- **2010 R&D100 Award** for developing the technology titled “*High-Performance, High-T_c Superconducting Wires enabled via Self-assembly of Non-superconducting Columnar Defects*”. The product is an ultra-high performance HTS Wire in which the performance has been significantly enhanced by the creation of self-assembled, nanoscale, non-superconducting columnar defects. Most high-performance HTS wires fabricated world-wide use this technology.
- **2010 R&D100 Award** for developing the technology titled “*Flexible, Large-area, Single Crystal-like, Si-based Semiconductor Substrates*”. This technology allows fabrication of low-cost, large-area (kilometer-long and meter wide), single-crystal-like substrates having a heteroepitaxially grown, single-crystal-like semiconductor surface. Flexible Si can be used for fabricating many devices such as low-cost, high-efficiency solar cells. A Battelle Ventures funded, startup company, Ampulse Inc. was formed to attempt commercialization of crystalline Si-based solar cells based on this technology.
- **2010 ASM-IIM Lectureship Award**: ASM-IIM (American Society of Metals - Indian Institute of Metals) Visiting Lecturers are Ambassadors-at-large of ASM International to the materials community in India. The ASM-IIM visiting lectureship program, established in 1979, is intended to promote international cooperation between ASM International and the materials community in India.
- **2009 R&D100 Award** for developing the technology titled “*Superconducting “Wires” by Epitaxial Growth on SSIFFSTM*”. The product is a “round” or low-aspect ratio, flexible, single-crystal, high-temperature superconducting wire with high performance for wide-ranging applications. This is the only 3rd generation HTS wire technology world-wide.
- **2009 Distinguished Alumnus Award** from the Indian Institute of Technology (IIT), Kharagpur, India. IIT Kharagpur is the oldest of the famous IIT’s and has a long list of very distinguished alumnus. Two other people also receiving this honor from IIT in 2009 include the CEO and Managing Director of Tata Motors Ltd., India (Tata Motors is the largest automobile manufacturer in India and also owns Land rover and Jaguar) as well as the President and Managing Director of Texas Instruments, India.
- **Fellow, WTN. Elected Fellow of the World Technology Network (WTN) July, 2009**. The World Technology Network (WTN) is a global meeting ground, a virtual think tank, and an elite club whose members are all focused on the business and science of bringing important emerging technologies of all types (from biotech to new materials, from IT to new energy sources) into reality. The WTN's membership is comprised of approximately 1000 members from more than 60 countries, judged by their peers to be the most innovative in the technology world. Most fellows in the “Materials” category are well-known and many are members of NAE and/or NAS.

- **2008 Nano50TM Innovator Award:** This award recognizes individuals who are leaders or pioneers in a specific area of nanotechnology and having a significant background of accomplishments in advancing the state of the art. The recognition was given for contributions to self-assembly of nanomaterials to form novel nanocomposites. His research was the first to demonstrate 3D self-assembly of one complex oxide material within another complex material. Developed with LDRD and DOE support, this self-assembly process was used to create insulating columns of non-superconducting materials within superconducting wires to significantly enhance their performances in high applied magnetic fields.
- **Fellow, APS. Elected Fellow of the American Physical Society (APS) Nov., 2008.** The APS is the world's leading physics society and is a leader in advancing and disseminating the knowledge about Physics. Less than one-half of one percent of the APS membership is elected for Fellow status.
- **2008 National Federal Laboratory Consortium Excellence in Technology Transfer Award** for the technology titled – “*High-Performance LaMnO₃-Enabled, High-Temperature Superconducting Tape*”. This national level award is given for advancing technologies from the laboratory to the marketplace. The award was again in collaboration with SuperPower Inc. located in Albany, NY.
- **2007 “Pride of India” Gold Award:** Sponsored by the NRI Institute, the award recognizes people of Indian origin around the world for outstanding achievements in their chosen fields. It also recognizes public service contributions toward the economic development of India and their country of residence. The NRI Institute is an international NGO of Indians, Non-resident Indians (NRI's) and Persons of Indian Origin (PIO's) with chapters world-wide in India, America, Europe, Asia, Middle-east and Australia. Award recipients were chosen from leaders, pioneers and professionals world-wide from the fields of Technology, Medicine, Business Management, Legal, Creative Arts, Public Service, or Academia. Non-Resident Indians (NRI's) or People of Indian Origin (PIO's) who serve as an inspiration to fellow NRIs, and who are recognized as pioneers in their professions were selected. Over 400 leaders in business, government, and education from all over the world attended the awards gala held at the Marriott Hotel in North Bethesda, MD on Sept. 28, 2007 and the award was bestowed by the *Indian Ambassador* to the USA. Many other notable guests were present including a member of India's Parliament, the President of the US-India Business Council as well as representatives from the local Congressman's office.
- **2007 MICRO/NANO 25 Award** from the R&D100 magazine for developing the technology titled “*Nanocomposites via Epitaxial, 3-D Self-Assembly of Nanodots of One Complex Material within Another*”. The MICRO/NANO 25 awards are given to the most innovative micro/nano technologies or products developed in any field world-wide in that calendar year. The award winning products, processes, and innovations were those groundbreaking technologies likely to have a large impact on their specific industries and society.
- **2007 R&D100 Award** for developing the technology titled “*High-performance LMO-Enabled High-temperature Superconducting Wire*”. The award was in collaboration with SuperPower Inc. located in Albany, NY.
- **2007 Southeast Federal Laboratory Consortium Excellence in Technology Transfer Award** for the technology titled – “*High-Performance LaMnO₃-Enabled, High-Temperature Superconducting Tape*”. The award was again in collaboration with SuperPower Inc. located in Albany, NY.
- **Fellow, ACERS. Elected Fellow of the American Ceramics Society (ACERS) May, 2007.** The American Ceramic Society is a global leader among professional organizations in supporting scientific research, emerging technologies, and current applications, in which ceramic materials are a key element. Election to Fellow status is quite selective.

	<ul style="list-style-type: none"> • 2006 Rochester Distinguished Scholar Medal from the University of Rochester¹⁴, NY. Given by the university to graduates who have had distinguished careers, most often in academia, industry or government. <i>Over the years there have less than 25 named Rochester Distinguished Scholars.</i> This award was bestowed at the 2006 Annual Commencement at the University of Rochester on May 20th and the recipient was also requested to address the graduating class during the Annual Doctoral Commencement Ceremony. • 2006 Nano50 Award for the technology titled “<i>The HTS Wires Enabled via 3D Self-Assembly of Insulating Nanodots</i>” presented by <i>Nanotech Briefs</i> magazine – the monthly digital publication from the publishers of <i>NASA Tech Briefs</i> – the Nano 50 recognizes the top 50 technologies, products, and innovators that have significantly impacted, or are expected to impact, the state of the art in nanotechnology. <i>Nanotech Briefs</i> magazine claims that the winners of the Nano 50 awards are the “best of the best” – the innovative people and designs that will move nanotechnology to key mainstream markets. Nano 50 nominations were judged by a panel of nanotechnology and MEMS experts. The technologies, products, and innovators receiving the 50 highest scores were named Nano 50 award winners. The award was given at the National Nano Engineering Conference in Boston, Nov. 9-10, 2006. • 2006 ORNL Inventor-of-the-Year Award from Battelle Memorial Institute, Columbus, Ohio. Awarded on April 28, 2006 at the 2006 Battelle Annual Recognition and Reward Banquet, Columbus, Ohio. Was named a “Battelle Star” at the banquet. • 2006 ASM-IIM Lectureship Award: ASM-IIM (American Society of Metals - Indian Institute of Metals) Visiting Lecturers are Ambassadors-at-large of ASM International to the materials community in India. The ASM-IIM visiting lectureship program, established in 1979, is intended to promote international cooperation between ASM International and the materials community in India. • 2006 Excellence in Technology Transfer Award from UT-Battelle. This award was given for the development, patenting, and transfer of high throughput buffer layer technology being commercialized by SuperPower, Inc. involving ion-beam-assisted deposition, that enabled the achievement of world record performance in SuperPower's long-length second-generation superconducting wires. • 2005 Award for Excellence in Science & Technology from UT-Battelle, Dec. 2005. Citation of award was: “For establishing an intellectual property portfolio that has resulted in ORNL’s world-wide dominance in high temperature superconducting wire fabrication.” • 2005 Global Indus Technovator Award awarded by a group based at MIT, Boston. The Global Indus Technovator Awards have been instituted to recognize and felicitate 10 distinguished innovators of Indus origin (countries in South Asia) working at the cutting-edge of technology that may be harnessed for far-reaching applications. • Fellow, ASM. Elected Fellow of the American Society of Metals (ASM), July, 2005. ASM International is a society whose mission is to gather, process and disseminate technical information. ASM fosters the understanding and application of engineered materials and their research, design, reliable manufacture, use and economic and social benefits. This is accomplished via a unique global information-sharing network of interaction among members in forums and meetings, education
--	--

¹⁴ The University of Rochester (located in Rochester, N.Y.) is one of the nation's leading private universities. The University which started in 1850, consistently ranks among the top colleges and universities nationwide in federally financed science, engineering, medical, and other research. In research productivity, the University ranks 12th among leading private universities nationwide. Rochester faculty and alumni have included eight Nobel Prize winners and 12 Pulitzer Prize winners. Rochester is a leading user and charter member in the University Research Association, which manages Fermilab, the world's highest-energy accelerator, in Batavia, Illinois.

programs, and through publications and electronic media.

- **2005 Exceptional Accomplishment Award** from DOE for “Exceptional Performance” at the 2005 U.S. Department of Energy Superconductivity Program Review. Certificate signed by Mr. William Parks, Acting Director, Office of Electric Transmission & Distribution and Dr. James Daley, Manager, DOE Superconductivity Program.
- **Fellow IOP. Elected Fellow of the Institute of Physics (IOP), UK, July, 2005.** The Institute of Physics is a leading international professional body and learned society with over 37,000 members, which promotes the advancement and dissemination of a knowledge of and education in the science of physics, pure and applied. It has a world-wide membership and is a major international player in: scientific publishing and electronic dissemination of physics; setting professional standards for physicists and awarding professional qualifications; and promoting physics through scientific conferences, education and science policy advice.
- **2004 Exceptional Accomplishment Award** from DOE for “Exceptional Performance” at the 2004 U.S. Department of Energy Superconductivity Program Review. Certificate signed by Mr. William Parks, Acting Director, Office of Electric Transmission & Distribution and Dr. James Daley, Manager, DOE Superconductivity Program.
- **Outstanding Young Tennessean Award, 2004.** Awarded by the Tennessee Junior Chamber of Commerce to recognize people who have risen to the top of their chosen fields and now act as role models for America’s youth. Past recipients of this award include former US Vice President Al Gore, Present Congressman Harold Ford from Memphis, Present Congressman Zack Wamp from Oak Ridge, Late Elvis Presley and many more.
- **Fellow, AAAS. Elected Fellow of the American Association for Advancement of Science, Oct. 2004.** The American Association for the Advancement of Science (AAAS) is an international non-profit organization dedicated to advancing science around the world by serving as an educator, leader, spokesperson and professional association. Election to Fellow status is highly selective.
- **Fellow, WIF. Elected Consulting Fellow of the World Innovation Foundation (WIF), Oct. 2004.** The WIF was founded by the late Nobel Laureate Dr. Glenn Seaborg, and the current President is Nobel Laureate Dr. Jerome Karle. The WIF is an international, multidisciplinary consultative research group that advises nations and their governments behind the scenes. There are currently about 2000 WIF members and fellows throughout the world, including 57 Nobel Laureates.
- Designated "**Battelle Distinguished Inventor**", *inaugural class*. Photograph and plaque put up in Battelle’s Inventor’s Hall of Fame, February 2003. Battelle distinguished inventors are chosen from all the national laboratories managed by Battelle for USDOE.
- **Exceptional Accomplishment Award** from DOE for “Exceptional Performance” at the 2003 U.S. Department of Energy Superconductivity Program Review. Certificate signed by Mr. Jimmy Glotfelty, Director, Office of Electric Transmission & Distribution and Dr. James Daley, Manager, DOE Superconductivity Program.
- **DOE’s Energy 100 Award in 2001** for developing the RABiTS Technology. These awards are for the finest 100 scientific accomplishments of the US Department of Energy since it opened its doors in 1977. Received a personal letter of congratulations from then U.S. Energy Secretary, Mr. Bill Richardson.
- **2001 Federal Laboratory Consortium Award** for excellence in technology transfer for the RABiTS technology. Received a personal letter of congratulations from our present Energy Secretary, Mr. Spencer Abraham.
- **1999 Massachusetts Institute of Technology’s, Technical Review, TR100 – Award.** This was an award for top 100 young innovators worldwide in any field of high technology whose inventions may make a *significant impact to technology in*

	<p><i>the next millennium</i>. Also, included in the 1999 TR100 innovators are the founders of Netscape, Yahoo, Hotmail and many other successful internet and advanced technology startups. The TR100 were chosen by a committee comprising three Nobel Laureates, head of the NASDAQ Stock Exchange, several leading University Presidents, CEO's and Vice-Presidents of some leading multinationals and Senior Partners of leading Venture Capital firms in the Silicon Valley.</p> <ul style="list-style-type: none"> • <u>1999 Inventor of the Year Award</u>, Oak Ridge National Laboratory. This was for <i>sustained</i> innovative accomplishments over an extended period of time. • <u>1999 R&D 100 Award</u> for developing the RABITS Technology. R&D100 awards are given to the most innovative products developed in any field world-wide in that calendar year. • <u>1999 R&D Sustained Development Accomplishment Award</u>, Oak Ridge National Laboratory. This is a <i>high</i> technical award given at ORNL. • <u>1999 American Museum of Science & Technology's "Tribute to Tennessee Technology" Award</u>. Given to the most important and significant technologies developed in the Tennessee area. • <u>1999 R&D Significant Development Accomplishment Award</u>, Oak Ridge National Laboratory. • <u>1997 Lockheed-Martin NOVA Award</u> for technical achievement. NOVA is the <i>highest</i> corporate award given by Lockheed-Martin Corporation. • <u>1997 R&D Significant Technical Accomplishment Award</u>, Oak Ridge National Laboratory.
<p>Professional Honors & Activities</p>	<ul style="list-style-type: none"> • <u>Member</u>, Board of Governors for the New York Sea Grant, since August 2015. • <u>Member</u>, Technical Advisory Committee of NYS Pollution Prevention Institute (NYSP2I) since 2016. • <u>Chair</u>, Eugene P. Wigner Distinguished Lecture Series on Science, Technology & Policy Organization Committee, Oak Ridge National Laboratory, 2013-2014. • <u>Chair</u>, Liane Russell Distinguished Early Career Fellowship Committee, Oak Ridge National Laboratory, 2013-2014. • <u>Chair</u>, ASM's Edward Camille Memorial Lecture Committee (2013-2015). • <u>Chair</u>, ASM's Medal for Advancement of Research and Distinguished Life Membership Committee (2012- 2013). • <u>Committee Member</u>, ASM's Medal for Advancement of Research and Distinguished Life Membership (2011-2015). • <u>Chair</u>, ASM's Fellows Committee (2011-2012). • <u>Committee Member</u>, ASM's Fellow Committee (2009-2012). • <u>Awards Committee Member</u>, ASM's Edward Camille Memorial Lecture Committee (2011 - 2013). • <u>Chair, Electronics Division</u>, American Ceramic Society (2011-2012). • <u>Awards Committee Member</u>, ASM's Medal for Advancement of Research (2011 - to date). • <u>Chair-Elect, Electronics Division</u>, American Ceramic Society (2010-2011). • <u>Vice-Chair, Electronics Division</u>, American Ceramic Society (2010-2011). • <u>Guest Editor</u>, Special Focused Issue of the Journal of Materials Research, January 2011 on "<i>Self and Directed Assembly of Materials</i>". • <u>Secretary, Electronics Division</u>, American Ceramic Society (2009-2010). • <u>Member, Executive Editorial Board</u> (since 2007) of NanoTech Briefs Magazine. Since its launch in October 2003, Nanotech Briefs® magazine has provided its audience of design engineers and engineering managers with the latest information

	<p>on the real-world, near-term commercial applications of nanotechnology and MEMS.</p> <ul style="list-style-type: none"> • <u>Panel of Judges R&D100 Awards by invitation (2000, 2001, 2002, 2003, 2013, 2014, 2015, 2016)</u>. The R&D 100 Awards given by R&D magazine to recognize the most innovative 100 new technical products introduced in the world for the year in question. • <u>Chair and Vice-Chair, Corporate Fellows Council, UT-Battelle/Oak Ridge National Laboratory (2009-2014)</u>, The Corporate Fellows Council of Oak Ridge National Laboratory consists of the active ORNL staff members who have been designated corporate fellows and senior corporate fellows. The roles of the corporate fellows are (1) To articulate the ideas and concerns of the ORNL scientific and technical staff regarding objectives and directions of the Laboratory, (2) To advise ORNL management on specific scientific and technological issues and opportunities, and (3) To serve as a channel for communication between ORNL scientific and technical staff and ORNL senior management. • <u>Invited Lecturer for stand-alone, short course on superconductivity at the University of Talca, Chile</u>, December 18-24, Chile, 2000. • <u>Member, Advisory Board for the Materials Research Science & Engineering Center (MRSEC) of Excellence at Carnegie Mellon University</u> (by invitation during years 1999, 2000).
<p style="text-align: center;">Editorial Boards / Journals</p>	<ul style="list-style-type: none"> • <u>Member, Editorial Board, Nature Magazine's Scientific Reports, since April 2015.</u> • <u>Guest Editor, Special Focused Issue of the Journal of Materials Research</u>, July, 2013 on "<i>Frontiers in Thin-Film Epitaxy and Nanostructured Materials</i>". • <u>Principal Editor, Journal of Materials Research (since 2002)</u> - The journal of Materials Research is widely recognized as one of the top journals in the area of Materials Science & Engineering. • <u>Member, International Editorial Advisory Board (since 2003)</u>, Journal of the Korean Institute of Applied Superconductivity and Cryogenics. This is a leading journal in superconductivity originating from South Korea. • <u>Associate Editor, Journal of the American Ceramic Society (since 2004)</u> – This journal is recognized as one of the top journals in the field of ceramics. (Associate Editor since 6/2004) • <u>Member, Advisory Board, Superconductor Science & Technology (2005-2012)</u> – This journal is recognized as one of the top journals in the field of superconductivity. The journal is published by the Institute of Physics, UK. • <u>Member, Advisory Board (since 2008) of the Journal "Recent Patents on Materials Science"</u>. This journal publishes review articles written by experts in materials science summarizing recent patents on novel materials/inventions/methods/techniques in material science and debuted in January 2008. The journal is published by Bentham Science Publishers, a leading international publisher of high quality scientific journals and books. Bentham currently publishes 79 titles in 24 disciplines of science. • <u>Program Committee Member</u>, Applied Superconductivity Conference (ASC) 2002. • <u>Program Committee Member</u>, Applied Superconductivity Conference (ASC) 2000. • <u>Technical Advisor</u> from the Superconducting Materials Committee for the TMS publication "<i>Journal of Minerals, Metals and Materials (JOM)</i>" for 93-95.

Conferences /
Workshops

- **Overall Co-Chair or Organizer**, *2014 Fall MRS Meeting* held in Boston, December, 2014.
- **International Advisory Committee**, **International Workshop on Coated Conductors for Applications" (CCA2014)** to be held at Jeju Island, S. Korea, Nov. 30 – Dec. 2, 2014.
- **Co-Organizer of the 2014 RF Mehl Medal Symposium on Frontiers in Nanostructured Materials and their Applications** held at the 2014 TMS Meeting, Feb. 16-20, San Diego, CA.
- **Co-Organizer of the 2012 "Electronic Materials & Applications (EMA) Conference,"** held Jan 18-20, Orlando, FL, 2012.
- **International Advisory Committee**, **International Workshop on Coated Conductors for Applications" (CCA2012)** held at Hiedelberg, Germany, Nov. 14-16, 2012.
- **Co-Organizer** of the 2011 **"Directed Self-Assembly of Materials MRS Workshop,"** held Sept. 28, 2011 - October 1, Nashville, TN, 2011.
- **Co-Organizer** of the 2011 **Acta Met. Gold Award Special Focus Session**, MRS Spring Meeting, San Francisco, April, 2011.
- **International Advisory Committee**, **"International Workshop on Coated Conductors for Applications" (CCA2010)** held at Fukuoka, Japan, Oct. 28-30, 2010.
- **Co-Organizer of the Inaugural 2010 Electronic Materials and Applications (EMA2010) Conference** held at Orlando, FL, Jan. 20-22, 2010.
- **Co-Organizer of Symposium on Self-Assembly of Materials & Devices** at the 2010 MRS Spring Meeting, San Francisco, CA, April 5-9, 2010.
- **International Advisory Committee**, **"International Workshop on Coated Conductors for Applications" (CCA2009)** held at Barcelona, Spain, Nov. 22-24, 2009.
- **International Advisory Committee**, **"International Workshop on Coated Conductors for Applications" (CCA2008)** held at Houston, TX, Dec. 4-6, 2008.
- **Co-Organizer of the 15th International Conference on the Textures of Materials (ICOTOM)** Organized by The American Ceramic Society and The Minerals, Metals & Materials Society (TMS), June 1-6, 2008, Carnegie Mellon University Center - Pittsburgh, Pennsylvania, USA.
- **Co-Organizer of the 2007 International Workshop on Coated Conductors** held in Jeju Island, S. Korea from November 8-10, 2007.
- **Co-Organizer of Symposium on Basic and Applied Needs for Superconductors** at the Materials Science & Technology International Conference & Exhibition (MS&T 2007), held September 16-20, in Detroit, MI, 2007.
- **Co-Organizer of the 2006 International Workshop on Coated Conductors** held in Ludwigsburg, Germany from July 2-6, 2006.
- **Co-Organizer of Symposium on High-Temperature Superconducting Wires and Tapes** at the Materials Science & Technology International Conference & Exhibition (MS&T 2006), held October 15-19, 2006 in Cincinnati, OH.
- **Co-Organizer of Symposium on Microstructural & textural requirements for Functional Materials** at the Materials Science & Technology International Conference & Exhibition (MS&T 2006), held October 15-19, 2006 in Cincinnati, OH.
- **Co-Organizer of a US-Japan Workshop on High Temperature Superconductors at the PACRIM Meeting**, Maui, Hawaii, 2005.
- **Co-Organizer of Symposium titled "Epitaxial Growth of Oxides, Nitrides, Borides and Carbides,"** 107th Annual Meeting & Exposition of the American

	<p>Ceramic Society, April, 2005, Baltimore, MD.</p> <ul style="list-style-type: none"> • Co-Organizer of the 2004 International Workshop on Coated Conductors held in Tokyo, Japan in November, 2004. • Co-Organizer of Symposium titled “Synthesis, Properties, and Crystal Chemistry of Perovskite Based Materials,” 106th Annual Meeting & Exposition of the American Ceramic Society, April 18-21, 2004, Indianapolis. • Co-Organizer of Symposium titled “Epitaxial Growth of Functional Oxides,” 204th Annual Meeting of the Electrochemical Society,” October 12-17, 2003, Orlando, FL. • Co-Organizer of Symposium titled "High Temperature Superconductor Processing", at the 105th Annual Meeting & Exposition of the American Ceramic Society, April 27-30, 2003, held in Nashville, TN. • Co-Organizer of the 2002 International Workshop titled "International Workshop on Processing and Applications of Superconductors", Gatlinburg, TN, August 1-2, 2002. • Co-Organizer of Symposium titled "High Temperature Superconductor Processing", at the 104th Annual Meeting & Exposition of the American Ceramic Society, held in St. Louis, MO, April 28-May 1, 2002. • Co-Organizer of Symposium on High Temperature Superconductors at the 2002 TMS Annual Spring Meeting. • Co-Organizer of Symposium titled "Processing of Long Lengths of Superconductors", at the 1993 TMS Annual Fall Meeting, held in Pittsburgh, PA, Oct. 17-21. • Guest Editor, Special Issue of High-T_c Superconductors, <i>Journal of Minerals, Metals and Materials (JOM)</i>, August Issue, 1995. • Guest Editor, Special Issue of High-T_c Superconductors, <i>Journal of Minerals, Metals and Materials (JOM)</i>, December Issue, 1994. • Session Chairman at numerous symposia in the following conferences from 1992-2013: Materials Research Society (MRS), Technical Materials Society (TMS), American Physical Society (APS), International Cryogenic Materials, Conference (ICMC), Applied Superconductivity Conference (ASC), International Workshop on Critical Currents (IWCC), US-Japan Workshop on High Temperature Superconductivity, International Conference on Textures in Materials (ICOTOM).
<p style="background-color: #cccccc; padding: 5px;">Patents-Summary</p>	<ul style="list-style-type: none"> • Over 150 patent applications and/or invention disclosures filed. • 87 issued patents (70 US and 17 International patents). • 70 US patents issued to date: US Patent Nos. 5, 739, 086; 5, 741, 377; 5, 846, 912; 5, 898, 020; 5, 964, 966; 5, 958, 599; 5, 968, 877; 6, 077, 344; 6, 106, 615; 6, 114, 287; 6, 150, 034; 6, 156, 376; 6, 151, 610; 6, 159, 610; 6, 180, 570; 6, 235, 402; 6, 261, 704; 6, 270, 908; 6, 331. 199; 6,375,768; 6, 399, 154; 6, 451, 450; 6, 447, 714; 6, 440, 211; 6, 468, 591, 6, 486, 100; 6, 599, 346; 6, 602, 313, 6, 607, 313; 6, 607, 838; 6, 607, 839; 6, 610, 413; 6, 610, 414; 6, 635, 097; 6, 645, 313; 6, 663, 976; 6, 670, 308; 6, 675, 229; 6, 716, 795; 6, 740, 421; 6, 764, 770; 6, 784, 139; 6, 790, 253; 6, 797, 030; 6, 846, 344; 6, 782, 988; 6, 890, 369; 6, 902, 600; 7, 087, 113; 7, 258, 928; 7, 510 997; 7, 683, 010; 7, 879 161; 7, 906, 229; 7, 919, 435; 8, 034, 745; 8, 119, 571; 8, 178, 221; 8, 210, 420; 8, 227, 082; 8,424,745; 8,481,460; 8, 518, 526; 8, 536, 098; 8, 685, 549; 8, 748, 349; 8, 748, 350; 8, 795, 854; 8, 987, 736, 8, 993, 092. • 17 international patents issued to date: Australian Patent No. 8349510, Australian Patent No. 713982, Canadian Patent No. 2,217,822, Japanese Patent No. 03601830, European Region Patent No. EP 0830218, South Korea Patent No. 418279, Switzerland Patent No. 0830218, Germany Patent No. 0830218, Spain Patent No. 0830218, France Patent No. 0830218, Great Britain Patent No. 0830218, Italy Patent No. 0830218, Sweden Patent No. 0830218, Hong Kong Patent HK 1150093,

	<p>Chinese Patent CN101981699 and Chinese Patent CN1132585.</p> <ul style="list-style-type: none"> • <i>A majority of these issued patents have been licensed during the course of the last decade and a half!</i> • <i>Over 15 US patents presently pending.</i> • <i>Over 20 International patents pending.</i> • This is the <i>highest</i> number of issued US patents for any employee in the Battelle system (http://www.battelle.org/careers/battelle/about.stm). Battelle serves the U.S. Department of Energy in the management of four leading-edge national laboratories – Oak Ridge National Laboratory (ORNL), Pacific Northwest National Laboratory (PNNL), Brookhaven National Laboratory (BNL) and National Renewable Energy Laboratory (NREL).
<p>Publications-Summary</p>	<ul style="list-style-type: none"> • 45 invited book chapters and publications. • 350 publications in national and international journals and conference proceedings in a wide selection of journals including Science, Nature Communications, Nature’s Scientific Reports, Applied Physics Letters, Energy & Environmental Science, Physical Review B, Physics Review Letters, Physica C, Superconductor Science & Technology, Applied Superconductivity, Journal of Materials Research, Journal of Applied Physics, Science and Journal of Minerals, Metals & Materials, Cryogenics, Ultramicroscopy, Journal of American Ceramic Society, IEEE Transactions in Applied Superconductivity, Japanese Journal of Applied Physics, MRS Bulletin, Scripta Metallurgica, Materials Letters, Journal of Electronic Materials, Chemistry of Materials, Journal of Materials Science & Engineering, Materials Science Forum, Journal of Superconductivity and Nanomaterials. • Over 3000 citations from first author and second author papers alone. • Total number of citations over 13000. • H-index = 57. • i10 = 272. • An independent analysis of the field of high-temperature superconductors conducted by Thompson-Reuters’s Essential Science Indicators (ESI) and ScienceWatch.com, which tracks global trends and performance in research, <i>Dr. Amit Goyal ranks no. 1 worldwide in the total number of citations during the last decade (1999-2009)</i>. He also ranks no. 4 worldwide in the total number of papers published in same timeframe (this is still the highest number of papers by anyone outside of Japan). A recent interview with Amit is posted on ScienceWatch (http://sciencewatch.com/ana/st/hts/09maySTHTSGoya/). The analysis, conducted by ScienceWatch.com ranked authors, institutions, and countries worldwide by no. of citations, no. of papers, and average citations per paper.
<p>Presentations-Summary</p>	<ul style="list-style-type: none"> • Over 25 invited plenary or keynote presentations in national and international conferences. • Over 180 invited presentations in national and international conferences. • Over 300 presentations in national and international conferences.
<p>Books-Summary</p>	<ul style="list-style-type: none"> • Second Generation High-Temperature Superconducting Wires, edited by A. Goyal, under contract by Kluwer Academic Publishers. (published Oct. 2005) • Epitaxial Growth of Functional Oxides, edited by A. Goyal and W. Wong-Ng, under contract by Kluwer Academic Publishers. (published Spring, 2005) • Processing of Bulk, High-Temperature Superconducting Wires, by A. Goyal, under contract by Plenum Publishing Corporation. (published Spring 2005) • Processing of High Temperature Ceramic Superconductors, edited by R. L. Meng, A. Goyal, W. Wong, M. Matsumoto and H. Freyhardt, published by the American Ceramic Society, 2004.

	<ul style="list-style-type: none"> • Processing of High Temperature Ceramic Superconductors, edited by A. Goyal, W. Wong, M. Murakami and J. Driscoll, published by the American Ceramic Society, 2003. • Processing of Long Lengths of Superconductors, edited by U. Balachandran, E. W. Collings and A. Goyal, TMS, Warrendale, PA, 1994.
<p>Reviewer for Journals</p>	<ul style="list-style-type: none"> • Journals: Nature Magazine's Scientific Reports, Nature, Science, Advanced Functional Materials, Advanced Materials, Physica C, J. Materials Research., Applied Physics Letters, Physical Review B, Physical Review Letters, J. Applied Physics, Applied Superconductivity, J. of Electrochemical Society, Materials Letters, J. of Metals, Minerals and Materials. • SBIR: Have reviewed many DOE and DARPA proposals for small business innovation research grants. • NSF: Member in panel of reviewers under the Ceramics Program. • NSF: Reviewer for the COBASE program funded by the National Science Foundation (NSF) and administered by the Office for Central Europe and Eurasia of the National Research Council (NRC). The program provides grants to individual American specialists who plan to establish new research partnerships with their colleagues in Central/Eastern Europe (CEE) and the Newly Independent States of the former Soviet Union (NIS). This program is designed primarily to prepare these new partnerships for competition in NSF programs. • NSF MRSEC review board – have reviewed proposals from leading research universities to establish Materials Science & Engg. Centers of Excellence with typical budgets in the range of \$ 5M for 5 years. • R&D100: Invited to be on the panel of reviewers for the 2000, 2001, 2002, 2003 and 2013, 2014, 2015 and 2016 R&D100 awards. • DOE Annual University Peer Review: On the DOE panel of reviewers for 2000 Annual Peer Review for Universities to be held in Washington DC in July'2000. • AFOSR University Funding Review: Served as a reviewer for the Air Force's program for university funding in 2002.
<p>Student Advising / Mentorship</p>	<ul style="list-style-type: none"> • Have mentored many postdoctoral fellows over the years. Most are doing very well professionally: <ul style="list-style-type: none"> - Sung-Hun Wee: Was staff scientist at ORNL. <i>Now Senior Staff Scientist</i> at Hitachi Research Laboratory in CA. - Sukill Kang: <i>Now Professor</i> at Chonbuk National University, S. Korea. - Beyong-Won Kang: <i>Now Professor</i> at Gwangju Institute of Science and Technology (GIST), S. Korea. - Keith Leonard: <i>Now Staff Scientist</i> at MSTD, ORNL. - Noel Rutter: <i>Now Faculty member</i>, University of Cambridge, UK. - S. Sirinivasan: <i>Now Staff Scientist</i> at American Superconductor (AMSC). - Darren Verebelyi: <i>Now Director</i> at Global Solar. - John Mathis: <i>Now Associate Professor</i> at Embry-Riddle Aeronautical University, Florida. - Junsoo Shin: <i>Now at Louisiana State University</i>, Louisiana. - Jing Li: <i>Now at North Carolina State University</i>, Raleigh, North Carolina. - Jaun Yoo: <i>Now at Korea Advanced Institute of Science and Technology</i>, S. Korea - Bianca Shaw: <i>Presently RENEW Fellow</i>, University at Buffalo, NY. - Edward Righter: <i>Presently RENEW Fellow</i>, University at Buffalo, NY. - Kevin Meindl: <i>Presently RENEW Fellow</i>, University at Buffalo, NY. - Yves Mulowayi: <i>Presently RENEW Fellow</i>, University at Buffalo, NY.

	<ul style="list-style-type: none"> • Previously mentored undergraduate student: <ul style="list-style-type: none"> - Nathan Moody: <i>Now Senior staff scientist</i> at LANL. Originally came to ORNL as part of a summer student group almost 15 years back. Then he returned to do a personal science project with me. The report and poster on this science project allowed him to represent the USA around the world and got him a full 4-year scholarship at the University of Maryland. He called me in April 2013, informing me that he went on to pursue higher studies and did a Ph.D in Electrical Engineering and was now was a scientist at LANL. He stated that he called in April 2013, because he had just accepted to work with summer students at LANL for the summer of 2013, and just wanted to call and say thanks because according to him it was this stint at ORNL which inspired him to pursue science and get a doctorate and become a scientist! He stated he was now hoping to do similar mentorship to affect the life of another student! • Previously mentored graduate students: <ul style="list-style-type: none"> - Yongli Xu: <i>Now Senior Staff Scientist</i> at Staff Scientist at Guardian Industries, Detroit, MI. • Mentored high school students and have given lectures in local high schools. • Mentored undergraduate students: Most recent - Nancy Perez and Richard Kinch, U. of Puerto Rico. • Has served as a judge in the Southern Appalachian Science and Engineering Fairs and the Canada Wide Virtual Science Fairs. • Mentored graduate students: Yongli Xu, Uni. Of Cincinnati; C. J. Simon, U. of Tenn.; E. Yang, U. of Wisconsin.
<div style="background-color: #cccccc; padding: 5px; text-align: center;"> Funded Projects / Past Research Funding </div>	<p>Current and Past Funding:</p> <ul style="list-style-type: none"> • “Enhanced 2G HTS wire for Electric Motor Applications” with American Superconductor Corporation (AMSC) under DOE-EERE Program on Next Generation Electric Machines: Enabling Technologies (DE-FOA-0001467), University at Buffalo component, \$594,579.00, 2017 – 2020. • Developing the City of Buffalo’s Energy Plan: 2015 – 2020, \$ 673,417.00. • UB RENEW and BSA Partnership: 2015 – 2020, \$ 1,042,556.00. • Single-Crystal and Single-Crystal-Like Graphene in Large-Areas for Electric and Electronic Applications: Laboratory Directed Research and Development (LDRD) project, 2012 – 2015, \$ 1,00,000.00. • Roll-to-Roll Large-Scale Graphene Production by Graphene: Technology Innovation Project (TIP), 2013-2015, \$ 200,00.00 • Thin-Film Si Photovoltaics: Funds-in CRADA with Ampulse Corporation: 2011-2013, \$ 1,600,000.00. • Towards High-Performance, Earth-Abundant, Thin-Film Cu₂O-based Solar Cells: LDRD funded SEED Project, 2011-2012, \$ 200,000.00. • MgB₂-Ga Composite Conductors: Funds-in Work-for-Others (WFO) project with Gridlogic Inc., 2012-2013, \$ 100,000.00. • ORNL/AMSC CRADA: Development of RABiTS Based 2G Wire: Office of Electricity Delivery and Energy Reliability, 2011-2012, \$ 300,000.00. • Strategic Substrate Development for Coated Conductors: Office of Electricity Delivery and Energy Reliability, 2010, \$ 450,000.00. • ORNL/AMSC CRADA: Development of RABiTS Based 2G Wire: Office of Electricity Delivery and Energy Reliability, 2010, \$ 800,000.00. • ORNL-SuperPower CRADA: Development of MOCVD-based, IBAD- 2G Wires: Office of Electricity Delivery and Energy Reliability, 2010, \$ 800,000.00. • Engineered Defects for Coated Conductors: Office of Electricity Delivery and Energy Reliability, 2010, \$ 400,000.00.

- **Compact Transformers for Secure High-Power Density Applications:** LDRD project, 2008-2010, \$ 700,000.00.
- **Strategic Substrate Development for Coated Conductors:** Office of Electricity Delivery and Energy Reliability, 2009, \$ 425,000.00.
- **ORNL/AMSC CRADA: Development of RABiTS Based 2G Wire:** Office of Electricity Delivery and Energy Reliability, 2009, \$ 800,000.00.
- **MOCVD-based IBAD 2G Wire – SuperPower CRADA:** Office of Electricity Delivery and Energy Reliability, 2009, \$ 800,000.00.
- **Engineered Defects for Coated Conductors:** Office of Electricity Delivery and Energy Reliability, 2009, \$ 425,000.00.
- **Fundamental Mechanisms of Self-Assembly of Ordered Nanostructures in Heterogeneous Ceramic Materials:** LDRD project, 2007-2009, \$ 700,000.00.
- **Strategic Substrate Development for Coated Conductors:** Office of Electricity Delivery and Energy Reliability, 2008, \$ 425,000.00.
- **ORNL/AMSC CRADA: Development of RABiTS Based 2G Wire:** Office of Electricity Delivery and Energy Reliability, 2008, \$ 800,000.00.
- **ORNL-SuperPower CRADA: Development of MOCVD-based, IBAD- 2G Wires:** Office of Electricity Delivery and Energy Reliability, 2008, \$ 800,000.00.
- **Engineered Columnar Defects for Coated Conductors:** Office of Electricity Delivery and Energy Reliability, 2008, \$ 425,000.00.
- **CRADA with Directed Vapor Technologies:** Office of Electricity Delivery and Energy Reliability, 2008, \$ 35,000.00.
- **Funds-in WFO with NanoSolar Inc.:** Funds-in, 2008, \$ 30,000.00.
- **MetOx Technologies CRADA:** Office of Electricity Delivery and Energy Reliability, 2006-2008, \$ 795,000.00.
- **Nanocomposite Dielectrics: New Smart Materials for Electric Power Applications and Smart Grid:** LDRD project, 2005-2007, \$ 700,000.00.
- **ORNL/AMSC CRADA: Development of RABiTS Based 2G Wire:** Office of Electricity Delivery and Energy Reliability, 2007, \$ 850,000.00.
- **ORNL-SuperPower CRADA: Development of MOCVD-based, IBAD- 2G Wires:** Office of Electricity Delivery and Energy Reliability, 2007, \$ 800,000.00.
- **Strategic Substrate Development for Coated Conductors:** Office of Electricity Delivery and Energy Reliability, 2007, \$ 500,000.00.
- **Engineered Columnar Defects for Coated Conductors:** Office of Electricity Delivery and Energy Reliability, 2007, \$ 350,000.00.
- **High-Performance, Low-Cost Photovoltaic Cells:** Battelle Memorial Institute, 2005-2006, \$ 130,000.00.
- **A Novel Thermomechanical Process for Producing Fe-3%Si Magnetic Steel Sheet for Transformers:** LDRD project, 2004-2006, \$ 700,000.00.
- **Large-Area, Flexible, Heteroepitaxial, Single-Crystal-like Diamond Films on Low-Cost Substrates for Wide-Ranging Electronic Applications:** SEED project, 2005-2007, \$190,000.00.
- **ORNL/AMSC CRADA: Development of RABiTS Based 2G Wire:** Office of Electricity Delivery and Energy Reliability, 2006, \$ 800,000.00.
- **ORNL/AMSC FUNDS-IN CRADA: Development of RABiTS Based 2G Wire:** Office of Electricity Delivery and Energy Reliability, 2006, \$ 180,000.00.
- **Epitaxial Coatings for Coated Conductors:** Office of Electricity Delivery and Energy Reliability, 2006, \$ 850,000.00.
- **ORNL-SuperPower CRADA: Development of IBAD-based 2G Wires:** Office of Electricity Delivery and Energy Reliability, 2006, \$ 800,000.00.

	<ul style="list-style-type: none"> • <u>ORNL – American Superconductor Strategic Research:</u> Office of Electricity Delivery and Energy Reliability, 2005, \$ 800,000.00. • <u>ORNL/AMSC FUNDS-IN CRADA: Development of RABiTS Based 2G Wire:</u> Office of Electricity Delivery and Energy Reliability, 2005, \$ 180,000.00. • <u>RABiTS Substrates Research and Development:</u> Office of Electricity Delivery and Energy Reliability, 2005, \$ 1,000,000.00. • <u>Coated Conductor Strategic Research:</u> Office of Electricity Delivery and Energy Reliability, 2005, \$ 800,000.00. • <u>Growth of MgB₂ for Superconductor Applications:</u> SEED project, 2002-2004, \$30,000.00. • <u>RABiTS Template Research and Development:</u> Office of Electricity Delivery and Energy Reliability, 2004, \$ 900,000.00. • <u>ORNL – American Superconductor Strategic Research:</u> Office of Electricity Delivery and Energy Reliability, 2004, \$ 925,000.00. • <u>ORNL/AMSC FUNDS-IN CRADA: Development of RABiTS Based 2G Wire:</u> Office of Electricity Delivery and Energy Reliability, 2004, \$ 180,000.00. • <u>RABiTS-based Strategic Research:</u> Office of Electricity Delivery and Energy Reliability, 2004, \$ 900,000.00. • <u>ORNL/AMSC CRADA: Development of RABiTS Based 2G Wire:</u> Office of Electricity Delivery and Energy Reliability, 2003, \$ 800,000.00. • <u>ORNL/AMSC FUNDS-IN CRADA: Development of RABiTS Based 2G Wire:</u> Office of Electricity Delivery and Energy Reliability, 2003, \$ 180,000.00. • <u>RABiTS-based Strategic Research:</u> Office of Electricity Delivery and Energy Reliability, 2003, \$ 700,000.00. • <u>ORNL/AMSC CRADA: Development of RABiTS Based 2G Wire:</u> Office of Electricity Delivery and Energy Reliability, 2002, \$ 800,000.00. • <u>ORNL/AMSC FUNDS-IN CRADA: Development of RABiTS Based 2G Wire:</u> Office of Electricity Delivery and Energy Reliability, 2002, \$ 180,000.00. • <u>Oxford Superconductors – ORNL CRADA:</u> Office of Electricity Delivery and Energy Reliability, 2000-2002, \$ 200,000.00. • <u>Microcoating Technologies – ORNL CRADA:</u> Office of Electricity Delivery and Energy Reliability, 2000-2002, \$ 200,000.00. • <u>3M – ORNL CRADA:</u> Office of Electricity Delivery and Energy Reliability, 1998-2002, \$ 2,000,000.00. • <u>Midwest Superconductivity:</u> Office of Electricity Delivery and Energy Reliability, 1995-1997, \$ 1,000,000.00. • <u>General Electric (GE) – ORNL CRADA:</u> Office of Electricity Delivery and Energy Reliability, 1992-1995, \$ 1,500,000.00. • <u>ORNL/AMSC CRADA: Development of BSCCO-based HTS wires:</u> EERE, 1991-1995, \$ 2,000,000.00. • <u>Strategic High-Temperature Superconductivity Research:</u> EERE, 1991-1995, \$ 1,500,000.00.
<div style="background-color: #cccccc; padding: 5px; text-align: center;"> Invited Publications </div>	<ol style="list-style-type: none"> 1. Invited Overview Chapter in second edition of handbook titled “<i>Nanotechnologies to enable high-performance superconductors for energy applications</i>”, published by Wiley-VCH, 2013, edited by J. Garcia, Spain. 2. Invited Book Chapter for book titled “<i>Interfaces in Electronic Materials</i>” published by Francis Dodds of Woodhead Publishing, 2011. 3. Invited Overview Chapter in handbook titled “<i>Nanotechnology for the Energy Challenge</i>”, published by Wiley-VCH, 2009, edited by J. Garcia, Spain. 4. Invited Overview Chapter in book titled “<i>Thin Film Metal-Oxides: Fundamentals</i>

	<p><i>and Applications in Electronics and Energy</i>” published by Springer, 2009, edited by S. Ramanathan, Harvard University.</p> <ol style="list-style-type: none"> 5. Invited Overview Chapter in book titled “CSD of Functional Oxide Thin Films”, To be published by Wiley-VCH, 2009, edited by T. Schneller, R. Waser and D. Payne. 6. Invited Paper, titled “Multifunctional, phase-separated, BaTiO₃+CoFe₂O₄ cap buffer layers for improved flux-pinning in YBa₂Cu₃O_{7-δ} based coated conductors,” to be published in special issue of Superconductor Science & Technology, 2009. 7. Invited Paper, titled “Enhanced and Uniform in-Field Performance in Long (Gd,Y)-Ba-Cu-O Tapes with Zirconium Doping Fabricated by Metal Organic Chemical Vapor Deposition,” to be published in special issue of Superconductor Science & Technology, 2009. 8. Invited Paper, titled “Effects on J_c of Pining Center Morphology for Multiple-in-Line-Damage in Coated Conductor and Bulk, Melt-Textured HTS,” to be published in special issue of Physica C, 2009. 9. Invited Paper, titled “Magnetic field orientation dependence of flux pinning in (Gd,Y)Ba₂Cu₃O_{7-x} coated conductor with tilted lattice and nanostructures,” to be published in special issue of Physica C, 2009. 10. Invited paper, titled “Enhanced flux pinning in MOCVD-YBCO films through Zr-additions: Systematic feasibility studies,” to be published in special issue of Physica C, 2009. 11. Invited Overview Chapter in Encyclopedia of Materials: Science and Technology (EMSAT) on the RABiTS technology. 2007 Elsevier Ltd. All rights reserved. Editors: K. H. Jürgen Buschow, Robert W. Cahn, Merton C. Flemings, Bernard Ilshner (print), Edward J. Kramer, Subhash Mahajan, and Patrick Veyssière (updates), ISBN: 978-0-08-043152-9, pgs. 1-5. 12. Invited Overview Chapter in Book titled “Flux Pinning and AC loss Studies on YBCO Coated Conductors” edited by M. Parans Paranthaman and Venkat Selvamanickam, published by Nova Science Publishers. 13. Invited paper, published in the proceedings of the 1st International Congress on Ceramics, held in Toronto, Canada, June, 2006. 14. Invited Overview Chapter in Book titled “Second generation HTS Conductors” edited by A. Goyal, Published by Kluwer Academic Publishers, NY, October, 2005. 15. Invited Overview Paper, published in the Proc. Of the ISS’2004 in Physica C, 2005. 16. Invited Overview Paper, Published in the MRS Bulletin, August, 2004. 17. Invited Overview Chapter in Book “High Temperature Superconductivity I: Materials,” edited by A.V. Narlikar, pp. 377-398, 2004, published by Springer, NY. 18. Invited Overview Chapter in Book “Recent Research Developments in Applied Chemistry,” A new series in Applied Chemistry by Transworld Research Network, containing review articles, to be published 2004. 19. Invited Overview Chapter in Book on "Electron Backscatter Diffraction in Materials Science," pp. 319-337, 2000, Published by Kluwer Academic/ Plenum Publishers, New York, edited by A. J. Schwartz, M. Kumar and B. L. Adams. 20. Invited Overview Paper, published in the Proc. of ISS'2000, Tokyo, published by ISTE, Japan. 21. Invited Overview Paper, published in the Proc. of the IWCC'2000, Fukuoka, Japan, Oct. 2000. 22. Invited Overview Paper, J. of Minerals, Metals and Materials Special Issue on 21st Century Technologies, July 1999. 23. Invited Overview Paper for a special issue of the Journal MICRON titled “Advanced Microscopy Studies of High temperature Superconductors”, Vol. 30, No.
--	--

5, pgs. 463-478, Oct. 1999.

24. **Invited Overview Paper** titled “High Critical Current Density $\text{YBa}_2\text{Cu}_3\text{O}_7$ Tapes Using the RABiTS Approach”, J. of Superconductivity, 11, 481, 1998.
25. **Invited Overview Paper** for a Handbook of Superconducting Materials, Institute of Physics, 1999.
26. **Invited Overview Paper** on RABiTS in a special issue of Applied Superconductivity, titled, Long Length Conductor Development for Large-scale Applications”, paper titled “Epitaxial Superconductors on RABiTS: A Route Towards High Critical Current Density HTS Wire”, vol. 4, pg. 403-428, 1997.
27. **Invited Overview Paper** for a special issue of the Journal of Materials Research for the 10th Anniversary of HTS Materials, paper titled “Conductors with Controlled Grain Boundaries: An Approach to the Next Generation, High Temperature Superconducting Wire”, vol. 12, pg. 2924-2940, 1997.
28. **Invited Plenary Lecture Overview Paper** for Proceedings of the 10th Frontiers in Electron Microscopy Conference, Chicago, Illinois. Published in Ultramicroscopy, 1997.
29. **Invited Overview Chapter** on Texture Development in Book Titled “Preferred Orientation Development and Property Anisotropy from High Temperature Forming Operations Metals and Intermetallics”, 1997.
30. **Invited Paper**, Proceedings of the 1998 US-Japan Workshop held in Okinawa, Japan, July 13-16, 1998.
31. **Invited Paper**, Proceedings of the 1998 TMS Meeting, To be published in the J. of Superconductivity, 1998.
32. **Invited Paper**, Proceedings of the 8th US-Japan Workshop, Dec. 7-10, Tallahassee, FL, 1997.
33. **Invited Chapter** in Book titled “Synthesis and Properties of Advanced Materials”, with D. M. Kroeger, D. F. Lee and E. D. Specht, Kluwer Academic Publishers, pgs. 117-148, 1997.
34. **Invited Paper**, EMSA '97 on Grain Boundary Studies of HTS materials, Proceedings of the EMSA meeting, 1997.
35. **Invited Overview Paper** on Grain Boundaries in HTS Materials, Journal of Metals, Minerals and Materials, 1996.
36. **Invited Research Paper**, Symposium on High Temperature Superconductors, 1996 Spring TMS Meeting, and Anaheim, CA.
37. **Invited Research Paper**, Symposium on High Temperature Superconductors, 1995 Spring TMS Meeting (Feb 28th - Mar 3rd), Las Vegas, NV; Published in the J. of Electronic Materials, titled “Mesotexture and Microtexture in Bi-2223 Powder-in-tube Conductors”.
38. **Invited Research Commentary**, J. of Minerals, Metals and Materials Special Issue on Superconductors, titled “Progress Towards Bulk applications of High- T_c Superconductors”, JOM, Aug. 1995.
39. **Invited Research Paper**, Symposium on High Temperature Superconductors, 1994 Spring TMS Meeting (Feb 28th - Mar 3rd), San Francisco, CA; published in the J. of Electronic Materials, titled “Dependence of Critical Current Density on Microstructure and Processing of High- T_c Superconductors”.
40. **Invited Research Commentary**, J. of Minerals, Metals and Materials Special Issue on Superconductors, titled “Advances in Processing of High- T_c Superconductors for Bulk Applications”, JOM, Dec. 1994.
41. **Invited Review Article** with D. M. Kroeger, “Models for Long Range Current Flow in Bulk Oxide Superconductors”, J. of Minerals, Metals and Materials, Dec. 1994, pg. 14.
42. **Invited Research Paper** with D. M. Kroeger, E. D. Specht, J. E. Tkaczyk, J. Sutliff,

	<p>J. A. Deluca, G. N. Riley, Jr., L. Masur, "Local Texture and Grain Boundary Misorientations in High-J_c Oxide Superconductors", Published in J. of Superconductivity, Dec. 1994.</p> <p>43. Invited Research Paper with D. M. Kroeger, E. D. Specht, J. E. Tkaczyk, J. Sutliff, J. A. Deluca, G. N. Riley, Jr., L. Masur, "Local Texture and Grain Boundary Misorientations in High-J_c Oxide Superconductors", Published in J. of Superconductivity, Dec. 1994.</p> <p>44. Invited Chapter in Book titled "Interface and Grain Boundary Chemical Structures in YBaCuO materials", with Z. L. Wang, R. Kontra, D. M. Kroeger and R. K. Williams, 1994.</p> <p>45. Invited Review Article - with Z. L. Wang, R. Kontra and D. M. Kroeger, "Microstructures and Flux-pinning in Melt-processed 123", Materials Science Forum, 1993.</p> <p>46. Invited Review Article with D. M. Kroeger, "Critical Currents and Microstructure in Oxide Superconductors", J. of Minerals, Metals and Materials, Oct. 1992.</p>
<p>Plenary and Invited Presentations</p>	<ol style="list-style-type: none"> 1. Invited Keynote Speaker, EMN Meeting on Smart and Multifunctional Material, June 24-28, 2017 Rome, Italy. http://emnmeeting.org/Europe/smm/ 2. Invited Plenary Keynote Speaker, 9th World Congress on Materials Science and Engineering, June 12-14, 2017 Rome, Italy. http://materialsscience.conferenceseries.com/europe/?utm_medium=email&utm_source=MailDirect&utm_campaign=Materials+Congress+2017+25th+j 3. Invited Keynote Speaker, 35th Greater Buffalo Environmental Conference, March 21st, 2017, Buffalo, NY. 4. Invited Plenary Keynote Speaker, International Conference on Advanced Materials, SCICON '16 theld at Coimbatore, India, December 19-21, 2016. 5. Invited Keynote Speaker at the Symposium on Materials for Energy and Environment Sustainability at Shibaura Institute of Technology, Tokyo, Japan on December on December 16th, 2016. 6. Invited Speaker at the 29th International Superconductivity Symposium (ISS 2016), Tokyo, Japan on December 13-15, 2016. 7. Invited Plenary Keynote Speaker, Nanoenergy Nanosystem 2016 (NENS 2016) Beijing, China, from July 13-15, 2016. 8. Invited Keynote Speaker, Symposium on Electronic and Magnetic Materials at the 9 Pacific Rim International Conference on Advanced Materials and Processing (PRICM9) to be held in Kyoto, Japan, August 1 to 5, 2016. 9. Invited Keynote Speaker, 6th Annual New Energy Forum - 2016 (NEF 2016), Kintex, S. Korea, from June 30th – Jul 3rd, 2016. 10. Invited Speaker, 2016 EMN Qingdao Meeting, to be held from June 7-10, 2016 at Qingdao, China. 11. Invited Speaker, 2016 MRS Spring Meeting, to be held in March 28-April 1, 2016 Phoenix, Arizona. 12. Invited Speaker, 2016 Electronic Materials and Applications (EMA), Jan. 20-22, Orlando, Florida). 13. Invited Speaker, 2015, The International Summit Forum on Materials Genome Initiative, China-MGI'2015, Shanghai, September 17-20, 2015. 14. Invited Speaker, 2015, National University of Singapore (NUS), Singapore, July 23rd, 2015. 15. Invited Plenary Keynote Speaker, Energy, Materials & Nanotechnology, http://www.emnsummer.org/2015/keynotes/, Cancun Meeting, Cancun, Mexico, June 8-11, 2015. 16. Invited Speaker, 2015 10th Annual Energy Harvesting Workshop, to be held in

Blacksburg, VA, September 13-15, 2015.

17. **Invited Speaker**, 2015 TMS 144th Annual Meeting & Exhibition, to be held in Orlando, FL, March 15-19, 2015.
18. **Invited Speaker**, 2015 MRS Spring Meeting, held in San Francisco, CA, April 6-10, 2015.
19. **Invited Speaker**, 2015 Electronic Materials & Applications (EMA), held in Orlando, FL, January 21-23, 2015.
20. **Invited Speaker**, 2014 MRS Fall Meeting, Graphene Symposium, held in Boston, MA, Nov. 30 – Dec. 4, 2014.
21. **Invited Speaker**, 2014 MRS Fall Meeting, Roll-to-Roll Flexible Electronics Symposium, to held in Boston, MA, Nov. 30 – Dec. 4, 2014.
22. **Invited Speaker**, College of Engineering, University of Wisconsin, Madison, WI, Oct. 28, 2014.
23. ***Invited Plenary Speaker***, BIT's 4th New Energy Forum to be held during September 21-23, in Qingdao, China, 2014.
24. **Invited Speaker**, Materials Science & Engineering Seminar, Distinguished Speaker Series, North Carolina State University, February 7, 2014.
25. ***Invited Plenary Speaker***, FIN-2013, BIT's 1st Frontier Industrial Forum 2013, Qingdao, China, Oct. 24-26, 2013.
26. ***Invited Keynote Speaker in a Theme Area of Conference***, FIN-2013, BIT's 1st Frontier Industrial Forum 2013, Qingdao, China, Oct. 24-26, 2013.
27. **Invited Speaker**, 2013, 16th US-Japan Workshop on Advanced Superconductors, held in Dayton, OH., July 9-12, 2013.
28. **Invited Speaker**, 2013 Electronic Materials & Applications (EMA) Meeting, held in Orlando, FL, Jan 23-25, 2013.
29. **Invited Speaker**, 2012 MRS Fall Meeting, held in Boston, MA, Nov. 25-29, 2012.
30. **Invited Speaker**, DOE Headquarters, Inaugural lecture in a high-profile Science Lecture Series initiated by DOE Secretary Steven Chu.
31. **Invited Speaker**, 2012 MRS Spring Meeting, held in San Francisco, CA, April 9-13, 2012.
32. **Invited Speaker**, Nanofabrication Technologies for Roll-to-Roll Processing Workshop, an Academic-Industry Workshop on Technologies for American Manufacturing Competitiveness, held Sept. 27-28, Boston, MA, 2011.
33. **Invited Speaker**, 2011 MS&T Conference & Expo, Columbus, OH, Oct. 16-20, 2011.
34. **Invited Speaker**, Corning Incorporated, Corporate Research Labs, Corning, NY, March 10, 2011
35. ***Invited Plenary Guest Speaker***, 2011Kshitij, The Techno-Management Festival at IIT, Kharagpur, India, held in Kharagpur, India, Jan. 28-31 (<http://www.ktj.in/#home>).
36. **Invited Speaker**, 2010 MRS Fall Meeting, Held in Boston, MA, Nov. 29 – Dec. 3, 2010.
37. **Invited Speaker**, 2010 International Workshop on Coated Conductors and Applications (CCA2010), held in Fukouka, Japan, Oct. 28-30, 2010.
38. **Invited Speaker**, 2010 MS&T Conference & Expo, Houston, TX, Oct. 17-21, 2010.
39. **Invited Speaker**, 2010 Applied Superconductivity Conference (ASC), held in Washington DC, Aug. 1-6, 2010.
40. ***Invited Keynote or Plenary Speaker***, Spring 2010 Meeting of the Ohio Section of the APS, April 30 – May 1, 2010, Flint, MI.
41. **Invited Speaker**, 2010 MRS Spring Meeting, held in San Francisco, CA, April 5-9,

	<p>2010.</p> <ol style="list-style-type: none"> 42. Invited Speaker, 2010 International Workshop on Coated Conductors and Applications (CCA2010), held in Barcelona, Spain, Nov. 22-24, 2009. 43. Invited Speaker, 2009 International Symposium on Superconductivity (ISS), Tsukuba, Japan, Nov. 2009. 44. Invited Speaker, 2009 MS&T Conference & Expo, held in Pittsburgh, PA, Oct. 25-29, 2009. 45. <i>Invited Institute Lecture</i>, Indian Institute of Technology, Kharagpur, India, August, 2009. 46. Invited Speaker, Technical Society of Knoxville, August, 2009. 47. Invited Speaker, College of Engineering, Oklahoma State University, June, 2009. 48. Invited Speaker, 2009 MRS Spring Meeting, held in San Francisco, CA, April 13-17, 2009. 49. Invited Speaker, 2008 Coated Conductor & Applications Workshop, held in Houston, TX, December 4-6, 2008. 50. Invited Speaker, 2008 National NanoEngineering Conference, held in Boston, MA, November 12-13, 2008. 51. Invited Speaker, 2008 Materials Science & Technology Conference, held in Pittsburgh, PA, October, 2008. 52. Invited Speaker, 2008 Applied Superconductivity Conference, held in Chicago, Aug. 18-23, 2008. 53. Invited Speaker, 15th International Conference on the Textures of Materials (ICOTOM), June 1-6, 2008. 54. Invited Speaker, Materials Science & Engineering Department Seminar, University of Tennessee, Jan. 2008. 55. Invited Speaker, 2008 MRS Spring Meeting held in San Francisco, CA, March 24-28, 2007. 56. <i>Invited Keynote or Plenary Speaker</i>, 2007 Workshop on Advanced Materials for Energy Applications, held Barcelona, Spain, December 17-18, 2007. 57. <i>Invited Keynote or Plenary Speaker</i>, 2007 International Workshops on Coated Conductors for Application (CCA2007) held at the Suites Hotel, Jeju island in Korea, November 8-10, 2007. Requested to represent the USA and talk about the progress made in the US on coated conductors. 58. <i>Invited Speaker & Moderator</i>, 2007 National Nano Engineering Conference (NNEC2007), held in Boston, Nov. 14-15, 2007. 59. <i>Invited Plenary Speaker</i>, HK IAS-USA ICMR Workshop on Advanced Materials, Hong-Kong University of Science and Technology (HKUST), Hong-Kong, Sept. 12-15th, 2007. 60. Invited Speaker, Mechanical Engineering Department, Hing-Kong University of Science & Technology (HKUST), Hong-Kong, Sept, 2007. 61. Invited Speaker, 2007 Materials Science & Technology (MS&T 2007), Sept. 16-20, Detroit, MI, USA. 62. Invited Speaker, 2007 Joint Workshop on Integrated Electroceramic Functional Structures and Chemical Solution Deposition, held in Berchtesgaden, Germany, June 14-16th, 2007. 63. Invited Speaker, 2007 MRS Spring Meeting held in San Francisco, CA, April 9-13, 2007. 64. Invited Speaker, 2007 HTS Wire Development & Applications Workshop, Jan. 16-17, Panama City, Florida. 65. Invited Speaker, Siemens Corporate Technology, Bangalore, India, Dec. 8, 2006.
--	--

66. **Invited Speaker**, National Physical Laboratory, New Delhi, India, Dec. 1, 2006.
67. **Invited Speaker**, Indian Institute of Technology, New Delhi, India, Nov. 29, 2006.
68. **Invited Speaker**, Indian Institute of Science, Bangalore, India, Dec. 12, 2006.
69. **Invited Speaker**, Hybrid Electronic Devices, Bangalore, India, Dec. 13, 2006.
70. **Invited Speaker**, Indian Institute of Technology, Mumbai, Dec. 4, 2006.
71. **Invited Speaker**, Crompton-Greaves Corporate R&D, Mumbai, India, Dec. 18, 2006.
72. ***Featured Invited or Plenary Speaker***, National Nano Engineering Conference, Nov. 9-10, Boston, MA.
73. ***Special Invited Speaker***, International Symposium on Superconductivity (ISS2006), held in Nagoya, Oct. 30st-Nov. 1st, 2006.
74. ***Key Invited Overview or Plenary Speaker***, International Workshop on Coated Conductors for Applications, CCA 2006, held at Schlosshotel Monrepos, Ludwigsburg, Germany, July 03 to 05, 2006.
75. **Invited Speaker**, 1st International Congress on Ceramics (ICC), Toronto, CA, June, 2006.
76. **Invited Speaker**, 2006 Beijing International Materials Week (2006 BIMW), June 25-30, 2006, China.
77. **Invited Speaker**, 14th Annual International Conference on Composites/NANO Engineering, ICCE-14, July 2-8, 2006, Broomfield, CO.
78. **Invited Speaker**, College of Engineering, University of New Brunswick, Canada, June, 2006.
79. **Invited Speaker**, International Workshop on Coated Conductors for Applications (CCA2005) to be held at La Posada Hotel, Santa Fe, NM USA, December 4-7, 2005.
80. **Invited Speaker**, 12th US-Japan workshop on High Performance Superconductors, Lake Lawn Resort in Lake Delavan, Wisconsin, October 10-12, 2005.
81. ***Invited Plenary Speaker***, Swiss Workshop on Materials with Novel Electronic Properties, September 26 - 28, 2005, Les Diablerets Switzerland.
82. **Invited Speaker**, Korean Superconductivity Society Conference (KSC 2005), Pyung-Chang, South Korea, August 18-20, 2005.
83. **Invited Speaker**, Korean Institute of Machinery and Materials (KIMM), Changwon, August, 2005.
84. **Invited Speaker**, Korean Electrochemical Research Institute (KERI), Changwon, South Korea, August, 2005.
85. **Invited Speaker**, Symposium on Advanced Structural Materials at the Materials Research Symposium in Cancun, Mexico, August 2005.
86. **Invited Speaker**, Materials Research Symposium at the Department of Materials Science & Engineering, University of California, Santa Barbara, CA, April 28, 2005.
87. **Invited Speaker** at the Symposium titled 'Functional Ceramic Materials and Thin Films' to be held during the 2005 International Conference on Materials for Advanced Technologies (Singapore) scheduled for 3-8 July 2005.
88. **Invited Speaker**, 2005 MRS Spring Meeting, March 28-April 1, San Francisco, CA.
89. **Invited Speaker**, 107th Annual Meeting & Exposition of The American Ceramic Society, Baltimore, Maryland, April 10-13, 2005.
90. **Invited Speaker**, 6th Pacific Rim Conference on Ceramic Glass & Technology, September 11-16, 2005, Maui, Hawaii.
91. **Invited Speaker**, 2005 TMS Meeting and Exposition, Feb. 13-17, San Francisco, CA, 2005.
92. **Invited Speaker**, 12th Annual International Conference on Composites/NANO Engineering (ICCE-12), August 1-6, Tenerife, Canary Islands, Spain, 2005.

93. **Invited Speaker**, 17th International Symposium on Superconductivity 2004, ISS2004, Nov. 23-25, 2004, Tokyo, Japan.
94. **Invited Speaker**, Coated Conductor Workshop and Applications (CCA2004), Nov. 18-20, Kanagawa, Japan, 2004.
95. **Invited Speaker**, 2004 American Ceramic Society Annual Meeting, held in Indianapolis, IN, April 19-21, 2004.
96. **Invited Speaker**, ICMC Topical Conference of Superconductors on Materials, Processing and Critical Current of Superconductors, Feb. 10-13, 2004, Wollongong, NSW, Australia.
97. **Invited Speaker**, International Workshop "High Temperature Superconductors and Novel Inorganic Materials Engineering" (MSU-HTSC VII), held in Moscow, Russia, on June 20-25, 2004.
98. **Invited Speaker**, Eleventh Annual International Conference on Composites/NANO Engineering, ICCE-11, August 8-14, Hilton-Head Island, South Carolina, 2004.
99. **Invited Plenary Speaker**, International Coated Conductor Workshop, held in Orta, Italy, September 12-13, 2003. Requested to represent the USA and talk about the progress made in the US on coated conductors.
100. **Invited Speaker**, 12th International Workshop on Critical Currents (IWCC12), Tokyo, Japan, September 2003.
101. **Invited Speaker**, DOE Wire Workshop, Session on Substrates Development, St. Petersburg, FL, January, 2003.
102. **Invited Speaker**, DOE Wire Workshop, Session on YBCO, St. Petersburg, FL, January 2003.
103. **Invited Plenary Speaker**, Symposium on HTS superconductors at Thermec 2003, in Madrid, 7-11 July 2003.
104. **Invited Speaker**, Symposium on Recrystallization at Thermec 2003, in Madrid, 7-11 July 2003.
105. **Invited Speaker**, The 13th International Conference on Textures of Materials (ICOTOM 13), Aug. 26-30, Seoul, South Korea, 2002.
106. **Invited Speaker**, Korea Electrotechnology Research Institute, Changwon, Korea, Aug. 22, 2002.
107. **Invited Speaker**, Pohang University of Science & Technology, Department of Physics, Pohang Superconductivity Center, Pohang, Korea, Aug. 23, 2002.
108. **Invited Speaker**, Seoul National University, Seoul, Korea, Aug. 30, 2002.
109. **Invited Speaker**, International Conference on Metallurgical Coatings and Thin Films, April 22-26, 2002.
110. **Invited Speaker**, 10th International Ceramics Congress, CIMTEC, 2002, Italy, July 14-19, 2002.
111. **Invited Speaker**, ASM Local Chapter, March 2002.
112. **Invited Plenary Speaker**, Spring TMS Meeting, Seattle, WA, Feb. 2002.
113. **Invited Speaker**, American Ceramic Society Meeting, April, 2002.
114. **Invited Speaker**, Fall MRS Meeting, Boston, Nov. 2001.
115. **Invited Speaker**, Physics Division Colloquia, ORNL, Sept. 2001.
116. **Invited Speaker/Lecturer**, Short course on Control of Grain Boundary Networks in Polycrystalline Functional Materials and on High Temperature Superconductors, University of Talca, Chile, Dec. 11-21, 2000.
117. **Invited Speaker**, University of Chile, Santiago, Chile, Dec. 26, 2000.
118. **Invited Speaker**, International Workshop on Critical Currents and Applications of HTS," held in Fukuoka, Japan, Oct. 18-19, 2000.
119. **Invited Speaker**, ISS2000, International Superconductivity Symposium 2000 held

in Tokyo, Japan from Oct. 14-16.

120. **Invited Speaker**, International Superconductivity Technology Center (ISTEC), Nagoya, Japan, Oct. 20, 2000.
121. **Invited Speaker**, *Gordon Conference on Grain Boundaries in Ceramics*, held on Aug. 6-11, 2000, Meriden, NH.
122. **Invited Speaker**, E-Source Conference, November 13-16, 2000, Colorado Springs, CO.
123. **Invited Speaker**, Thermec'2000, Int. Conf. On Processing, Fabrication, Properties and Application, held at Las Vegas, Dec. 4-8, 2000.
124. **Invited Speaker**, 2000 ASM Fall Meeting, Symposium on Texture Analysis for Process and Quality Control, Oct. 9-12, St. Louis, MO.
125. **Invited Speaker**, 2000 TMS Fall Meeting, Symposium on Electron Backscatter Diffraction, Oct. 9-12, St. Louis, MO.
126. **Invited Speaker**, 2000 Applied Superconductivity Conference, held in Virginia Beach, September 18-22, 2000.
127. **Invited Speaker**, 2000 TMS Spring Meeting, Symposium on High Temperature Superconductors, Nashville, TN, March 12-15, 2000.
128. **Invited Speaker**, 2000 DOE Wire Development Workshop, held at St. Petersburg, FL., February, 2000.
129. **Invited Speaker**, Carnegie Mellon University, Materials Seminar Series, given on October 28, 1999.
130. **Invited Plenary Speaker**, 9th International Workshop on Critical Currents, July 7-10, 1999, Madison, Wisconsin.
131. **Invited Speaker**, 1999 American Ceramic Society Annual Meeting, held in Indianapolis, IN, April 25-28.
132. **Invited Speaker**, 12th. International Conference on Textures of Materials (ICOTOM12), Montreal, August 9-13, 1999.
133. **Invited Speaker**, 1999 DOE Wire Development Workshop, held at Cocoa Beach, FL 32931, January 12-13.
134. **Invited Speaker**, 1999 Spring TMS Meeting, held in San Antonio, Texas, February 15-19, 1999.
135. **Invited Speaker**, 1999 Electron Microscopy Meeting (EMSA), to be held in August, 1999, Portland, OR.
136. **Invited Speaker**, 1999 Fall MRS Meeting, held in Boston. MA, Nov-Dec, 1999.
137. **Invited Speaker**, First Regional Conference on Magnetic and Superconducting Materials (MSM-99), 27-30 September, 1999, Tehran - Iran.
138. **Invited Speaker**, 1998 International Workshop on Superconductivity, held in Okinawa, Japan, July 12-15, 1998.
139. **Invited Speaker**, 1998 Innovations in Materials Research Conference (IMC), held in Washington, DC, July 20-22, 1998.
140. **Invited Speaker**, 1998 DOE Workshop on Coated Conductors, held in Washington, DC, July 22-24, 1998.
141. **Invited Speaker**, 1998 MISON Meeting, held in Columbia, MO, July 27-31, 1998.
142. **Invited Speaker**, Fifth International Workshop on High Superconductors, held March 24-29, Moscow, Russia, 1998.
143. **Invited Speaker**, Processing and Critical Currents of High Temperature Superconductors, February 2-4, 1998 in Wagga, NSW, Australia.
144. **Invited Speaker**, 1998 Spring TMS Meeting, held in San Antonio, Texas, February 15-19.
145. **Invited Speaker**, 1998 Electron Microscopy Meeting (EMSA), held in July'98,

Atlanta, GA.

146. **Invited Speaker**, 8th US-Japan Workshop on High Temperature Superconductors, December 8-10, 1997, National Magnet High Field Laboratory (NHMFL) in Tallahassee, Fl.
147. **Invited Speaker**, Harvard University, Materials Science Center, Monday, Sept. 8, 1997.
148. **Invited Plenary Speaker** on Grain Boundary Studies of HTS Materials Using Electron Backscatter Kikuchi Diffraction, Frontiers in Electron Microscopy in Materials Science, June 4-7, Oak Brook, Illinois.
149. **Invited Speaker**, 1997 Spring MRS Meeting, held in San Francisco, CA, March 31 - April 4, 1997.
150. **Invited Speaker**, 1997 Spring TMS Meeting, held in Orlando, Florida, Feb. 1997.
151. **Invited Speaker**, 1997 Electron Microscopy Meeting (EMSA), held in August '97, Cincinnati, Ohio.
152. **Invited Speaker**, 1997 American Crystallographic Society Meeting, held in July, St. Louis, MO, 1997.
153. **Invited Speaker**, Wright-Patterson Air Force Base, Ohio, April, 1997.
154. **Invited Speaker**, University of Kansas, August, 1997.
155. **Invited Speaker**, 1997 US-DOE HTS Wire Development Workshop, February 6-7, Panama City, Florida.
156. **Invited Speaker**, 1996 Spring Technical Materials Society (TMS) Meeting, February 4-8, 1996 at Anaheim, CA, talk titled "Fabrication of Biaxially Aligned Polycrystalline HTSC Conductors", A. Goyal et al.
157. **Invited Speaker**, Rex '96, International Conference on Recrystallization and Related Topics", held in Monterrey, CA, Oct. 21-24, 1996.
158. **Invited Speaker**, Material Science Seminar on "Grain Boundary Networks and Percolation in HTS Materials", Dept. of Materials Science, University of Wisconsin, Sept. 12, 1996.
159. **Invited Speaker** on "RABiTS: A New Approach to High-Jc Conductors", Applied Superconductivity Center, University of Wisconsin, Sept. 13, 1996.
160. **Invited Speaker**, Sumitomo Electric Company, Osaka, Japan, on "RABiTS Technology and Percolation in HTS Materials" Oct. 25, 1996.
161. **Invited Speaker**, Fujikura Ltd., Tokyo, Japan, on "RABiTS Technology and Percolation in HTS Materials" Oct. 28, 1996.
162. **Invited Speaker**, Hitachi, Ibaraki, Japan, on "RABiTS Technology and Percolation in HTS Materials" Oct. 29, 1996.
163. **Invited Speaker**, National Research Institute for Metals, Tsukuba, Japan, on "RABiTS Technology and Percolation in HTS Materials" Oct. 25, 1996.
164. **Invited Speaker**, Nippon Steel Corporation, Tokyo, Japan, on "RABiTS Technology and Percolation in HTS Materials" Oct. 29, 1996.
165. **Invited Speaker**, ISTE, Ibaraki, Japan, on "RABiTS Technology and Percolation in HTS Materials" Oct. 29, 1996.
166. **Invited Speaker**, Seventh US-Japan Workshop on High-T_c Superconductors, 1995, October 23-27, Tsukuba, Japan, talk titled "Fabrication of Biaxially Textured Using the RABiTS Process", A. Goyal et al.
167. **Invited Speaker**, 1995 Fall Materials Research Society (MRS) Meeting, To be held in Nov, 1995 at San Francisco, CA, talk titled "Fabrication of Biaxially Aligned Polycrystalline HTSC using a New Process", A. Goyal et al.
168. **Invited Speaker**, 1995 Pacific Coast Regional Meeting (PCRM) of the American Ceramic Society, Nov 1-3, 1995 at Seattle, WA, talk titled "Microstructure and Superconducting Properties across Oriented Domains in Textured Bulk YBCO", D.

F. Lee, A. Goyal and D. M. Kroeger.

169. **Invited Speaker**, 1995 International Cryogenic Materials Conference (ICMC), July, 1995, Cleveland, Ohio, talk titled "Biaxially Textured Superconductors Fabricated using a Non-IBAD Process", A. Goyal et al.
170. **Invited Speaker**, 1995 International Workshop on Superconductivity co-sponsored by ISTE and MRS, June 18-21, Maui, USA, talk titled "Effect of Colony Microstructure on the Transport Critical Current of High-Jc Tl-1223 Thick Films", A. Goyal et al.
171. **Invited Speaker**, 1995 Spring Materials Research Society (MRS) Meeting, April, 1995, San Francisco, CA, talk titled "Texture and Grain Boundary Misorientation Distributions in Polycrystalline HTSC", A. Goyal et al.
172. **Invited Speaker**, 1995 Workshop on Processing of Thallium Oxide High Temperature Superconductors, Breckenridge, Colorado.
173. **Invited Speaker**, 1995 Spring Technical Materials Society (TMS) Meeting, February, 1995 at Las Vegas, Nevada, talk titled "Microtexture and Mesotexture in Bi-2223 Powder-in-tube Materials", A. Goyal et al.
174. **Invited Speaker**, 1995 US-DOE HTS Wire Development Workshop, February, St. Petersburg, FL, talk titled "Formation of Colonies of Aligned Grains During Thallination of Tl-1223 Thick Films", A. Goyal et al.
175. **Invited Speaker**, 1994 Pacific Coast Regional Meeting (PCRM) of the American Ceramic Society, Los Angeles, CA, Oct. 19-22, 1994, talk titled "Grain Boundary Misorientations and Critical Current Density in Tl-1223 Thick Films", A. Goyal et al.
176. **Invited Speaker**, 1994 Midwest Superconductivity Consortium's Workshop on Superconductivity, Aug. 11-12, 1994 at Purdue University, IN, talk titled "Effect of Grain Boundaries on Critical Current Density in HTSC Materials", A. Goyal et al.
177. **Invited Speaker**, Third Workshop on Processing of Thallium Oxide High Temperature Superconductors, talks titled "Processing of Powder-in-tube Tl-1223 Superconductors" and "Formation of Colonies in Spray-pyrolyzed Tl-1223 Thick Films", A. Goyal et al., Breckenridge, Colorado, June 2-3, 1994.
178. **Invited Speaker**, National Synchrotron Light Source (NSLS), Brookhaven, NY, March 28th, 1994, talk titled "Local texture in Tl-1223 thick Films and its Effect on Transport Critical Current Density", A. Goyal et al.
179. **Invited Speaker**, 1994 TMS Annual Spring Meeting, Symposium on High Temperature Superconductors, talk titled "Dependence of Critical Current Density on Microstructure in High Temperature Superconductors", A. Goyal et al., Feb. 28th-March 3rd, San Francisco, CA.
180. **Invited Speaker**, 1994 US-DOE HTS Wire Development Workshop, talk titled, "Measurement of Intrinsic Mechanical Properties of High Temperature Superconductors using a Mechanical Properties Microprobe", A. Goyal et al., February 23-25, St. Petersburg, Florida.
181. **Invited Speaker**, Second Workshop on the processing of Thallium-based High-T_c Superconductors, talk titled "Microstructure and Processing of Tl-based Superconductors", A. Goyal et al., February 14-15th, Golden, Colorado.
182. **Invited Speaker**, 1992 TMS Annual Fall Meeting, talk titled "Microstructure, Flux-pinning and Development of a Compatible Metallic Substrate for Melt-processing Y-123", A. Goyal et al., Symposium on High Temperature Superconductors, Oct., Chicago, IL.
183. **Invited Speaker**, 1992 TMS Annual Spring Meeting, Symposium on Processing of High-T_c Superconductors, talk titled "Microstructure and Critical Current Density in Melt-processed 123", A. Goyal et al., February, San Diego, CA.
184. **Invited Speaker**, 1992 US-DOE HTS Wire Development Workshop, talk titled

	<p>"YBaCuO Deposits on Ag-Pd Substrates", A. Goyal et al., February 19-20, Richmond, Virginia.</p> <p>185. Invited Speaker, 1992 US-DOE HTS Wire Development Workshop, talk titled "Microstructures in Melt-processed Y123", A. Goyal et al., February 19-20, Richmond, Virginia.</p>
<p>Patents / Invention disclosures</p>	<ol style="list-style-type: none"> 1. A. Goyal, J. D. Budai, D. M. Kroeger, D. P. Norton, E. D. Specht and D. K. Christen, "Structures Having Enhanced Biaxial Texture and Method to Fabricating Same - I". <u>US Patent No. 5, 739, 086</u>, April 14, 1998. 2. A. Goyal, J. D. Budai, D. M. Kroeger, D. P. Norton, E. D. Specht and D. K. Christen, "Structures Having Enhanced Biaxial Texture and Method to Fabricating Same - II". <u>US Patent No. 5, 741, 377</u>, April 21, 1998. 3. V. Selvamanikam, A. Goyal and D. M. Kroeger, "Method of Preparing Y-123 by Melt Processing", <u>US Patent No. 5, 846, 912</u>, December 8, 1998. 4. A. Goyal, J. D. Budai, D. M. Kroeger, D. P. Norton, E. D. Specht and D. K. Christen, "Structures Having Enhanced Biaxial Texture and Method to Fabricating Same - III". <u>US Patent No. 5, 898, 020</u>, April 27, 1999. 5. A. Goyal, J. D. Budai, D. M. Kroeger, D. P. Norton, E. D. Specht and D. K. Christen, "Structures Having Enhanced Biaxial Texture and Method to Fabricating Same - IV". <u>US Patent No. 5, 958, 599</u>, September 28, 1999. 6. A. Goyal, J. D. Budai, D. M. Kroeger, D. P. Norton, E. D. Specht and D. K. Christen, "Structures Having Enhanced Biaxial Texture and Method to Fabricating Same". <u>Australian Patent No. 713892</u>. 7. A. Goyal, J. D. Budai, D. M. Kroeger, D. P. Norton, E. D. Specht and D. K. Christen, "Structures Having Enhanced Biaxial Texture and Method to Fabricating Same". <u>European Umbrella Patent No. EP 0830218</u>. 8. A. Goyal, J. D. Budai, D. M. Kroeger, D. P. Norton, E. D. Specht and D. K. Christen, "Structures Having Enhanced Biaxial Texture and Method to Fabricating Same". <u>Korean Patent No. 418279</u>. 9. A. Goyal, J. D. Budai, D. M. Kroeger, D. P. Norton, E. D. Specht and D. K. Christen, "Structures Having Enhanced Biaxial Texture and Method to Fabricating Same". <u>Japanese Patent No. 03601830</u>. 10. A. Goyal, J. D. Budai, D. M. Kroeger, D. P. Norton, E. D. Specht and D. K. Christen, "Structures Having Enhanced Biaxial Texture and Method to Fabricating Same". <u>Canadian Patent No. 2,217,822</u>. 11. A. Goyal, E. Specht, D. Kroeger and M. Paranthaman, "Method of Forming Biaxially Textured Alloy Substrates and Devices Thereon - I," <u>US Patent 5, 964, 966</u>., October 12, 1999. Patent application was a combination of five inventions listed below: <ol style="list-style-type: none"> a. A. Goyal and D. M. Kroeger, "Method of Forming Biaxially Textured Articles Having Reduced Magnetism," ORNL/LMER Docket ERID No. 366. b. A. Goyal, D. M. Kroeger and M. Paranthaman, "Method of Forming Biaxially Textured Articles Having Reduced Magnetism," ORNL/LMER Docket ERID No. 367. c. A. Goyal, "Method of Forming Biaxially Textured Articles," ORNL/LMER Docket ERID No. 368. d. A. Goyal, E. D. Specht and D. M. Kroeger "Method of Forming Biaxially Textured Articles," ORNL/LMER Docket ERID No. 199. e. A. Goyal and D. M. Kroeger, "Method of Forming Biaxially Textured Articles," ORNL/LMER Docket ERID No. 363. 12. J. D. Budai, D. K. Christen, A. Goyal, Q. He, D. M. Kroeger, D. F., Lee, D. P. Norton, B. C. Sales and E. D. Specht, "High-T_c YBCO Superconductor Deposited on Biaxially Textured Ni Substrate," <u>US Patent 5, 968, 877</u>, October 19, 1999. 13. S.S. Shoup, M. Paranthaman, D.B. Beach, D.M. Kroeger, and A. Goyal, "Methods of Sol-gel Deposition of Buffer Layers on Biaxially Textured Ni Substrates," <u>US Patent 6, 077, 344</u>, June 20, 2000. 14. A. Goyal, E. Specht, D. Kroeger and M. Paranthaman, "Method of Forming Biaxially

Textured Alloy Substrates and Devices Thereon - II," US Patent 6, 106, 615, August 22, 2000.

15. D. F. Lee, D. M. Kroeger and A. Goyal, "Method of Deforming a Biaxially Textured Buffer Layer on a Textured Metallic Substrate and Articles Therefrom," US Patent 6, 114, 287, September 5, 2000.
16. A. Goyal, "Method for Making Biaxially Textured Articles by Plastic Deformation," US Patent No. 6,180, 570.
17. M. Paranthaman, D.F. Lee, D.M. Kroeger, and A. Goyal, "Buffer Layers on Rolled Nickel or Copper as Superconductor Substrates," U.S. Patent No. 6,150,034, November 21, 2000.
18. M. Paranthaman, D.F. Lee, D.M. Kroeger, and A. Goyal, "Buffer Layers on Metal Surfaces Having Biaxial Texture as Superconductor Substrates," U.S. Patent No. 6,156,376, December 5, 2000.
19. M. Paranthaman, D.F. Lee, D.M. Kroeger, and A. Goyal, "Buffer Layers on Metal Surfaces Having Biaxial Texture as Superconductor Substrates," U.S. Patent No. 6,159,610, December 12, 2000.
20. A. Goyal, "Biaxially Textured Articles formed by Plastic Deformation," US Patent No. 6,180,570, January 30, 2001.
21. S.S. Shoup, M. Paranthaman, D.B. Beach, D.M. Kroeger, and A. Goyal, "Buffer Layers on Biaxially Textured Metal Substrates," US Patent 6, 235,402, May 22, 2001.
22. A. Goyal, "Biaxially Textured Articles formed by Plastic Deformation," US Patent No. 6,375,768.
23. D. F. Lee, D. M. Kroeger and A. Goyal, "Preferentially oriented, High temperature superconductors by seeding and a method for their preparation," US Patent 6, 256.521, July 3, 2001.
24. M. Paranthaman, A. Goyal, D. M. Kroeger and F. A. List, "MgO buffer layers on rolled nickel or copper as superconductor substrates," US Patent 6,261,704, July 17, 2001.
25. R.K. Williams, M. Paranthaman, T.G. Chirayil, D.F. Lee, A. Goyal, and R. Feenstra, "Rare Earth Zirconium Oxide Buffer Layers on Metal Substrate," U.S. Patent No. 6,270,908, August 7, 2001.
26. A. Goyal, R. Williams and D. M. Kroeger, "Methods of Forming Biaxially Textured Articles by Powder Metallurgy," US Patent No. 6,331,199, December 18, 2001.
27. A. Goyal, "Method for making biaxially textured articles by plastic deformation," US Patent 6,375,768, April 23, 2002.
28. R.K. Williams, M. Paranthaman, T.G. Chirayil, D.F. Lee, A. Goyal, and R. Feenstra, "Laminate Article," U.S. Patent No. 6,399,154, June 4, 2002.
29. D. B. Beach, J. S. Morell, M. Paranthaman, T. Chirayil, E. D. Specht and A. Goyal, "Method of Depositing Buffer Layers on RABiTS from Solution", U.S. Patent No. 6,440,211, August 27, 2002.
30. A. Goyal and D. M. Kroeger, "Powder-in-tube and Thick-Film Methods of Fabricating High Temperature Superconductors Having Enhanced "Biaxial" Texture," ORNL/LMER Docket ESID No. 1697-X, US Patent application filed.
31. A. Goyal, R. Williams and D. M. Kroeger, "Biaxially Textured Articles Formed by Powder Metallurgy," US Patent No. 6,447,714, September 10, 2002.
32. A. Goyal, D. M. Kroeger, M. Paranthaman, D. F. Lee, R. Feenstra and D. P. Norton, "Method of Depositing a Protective Layer over a Biaxially Textured Alloy Substrate and Composition Therefrom", U.S. Patent No. 6,451,450, September 17, 2002.
33. M. Paranthaman, A. Goyal, D. M. Kroeger and F. A. List, "Method for making MgO buffer layers on rolled nickel or copper as superconductor substrates," ORNL/LMER Docket ERID No. 218. US Patent 6,468,591, October 22, 2002.
34. D. F. Lee, D. M. Kroeger and A. Goyal, "Method for Preparing Preferentially Oriented, High Temperature Superconductors using Solution Reagents," ORNL/LMER Docket ERID No. 534. US Patent 6, 486,100, November 26, 2002.

35. A. Goyal, R. Williams and D. M. Kroeger, "Biaxially Textured Articles Formed by Powder Metallurgy," US Patent 6,599,346, July 29, 2003.
36. A. Goyal, R. Williams and D. M. Kroeger, "Biaxially Textured Articles Formed by Powder Metallurgy," US Patent 6,602,313, August 5, 2003.
37. A. Goyal, R. Williams and D. M. Kroeger, "Biaxially Textured Articles Formed by Powder Metallurgy," US Patent 6,607,838, August 19, 2003.
38. A. Goyal, R. Williams and D. M. Kroeger, "Biaxially Textured Articles Formed by Powder Metallurgy," US Patent 6,607,839, August 19, 2003.
39. A. Goyal, R. Williams and D. M. Kroeger, "Biaxially Textured Articles Formed by Powder Metallurgy," US Patent 6,610,413, August 26, 2003.
40. A. Goyal, R. Williams and D. M. Kroeger, "Biaxially Textured Articles Formed by Powder Metallurgy," US Patent 6,610,614, August 26, 2003.
41. A. Goyal, R. Williams and D. M. Kroeger, "Biaxially Textured Articles Formed by Powder Metallurgy," US Patent 6,635,097, October 21, 2003.
42. A. Goyal and D. M. Kroeger, "Powder-in-tube and Thick Film Methods of Fabricating High Temperature Superconductors Having Enhanced Biaxial Texture," US Patent 6,645,313, November 11, 2003.
43. D. B. Beach, J. S. Morell, M. Paranthaman, T. Chirayil, E. D. Specht and A. Goyal, "Laminate Articles on Biaxially Textured Metal Substrates", US Patent 6,663,976, December 16, 2003.
44. A. Goyal, "Method of Depositing Epitaxial Layers on a Substrate," US Patent 6,670,308, December 30, 2003.
45. D. P. Norton, A. Goyal and C. Park, "Buffer Architecture for Biaxially Textured Structures and Method of Fabricating Same," US Patent 6,716,795, April 6, 2004.
46. M. Paranthaman, T. Aytug, D. K. Christen, R. Feenstra and A. Goyal, "Buffer Layers and Articles for Electronic Devices," US Patent 6764770, July 20, 2004.
47. S. Sambasivan, A. Goyal, S. A. Barnett, I. Kim, D. M. Kroeger, "Conductive and Robust Nitride Buffer Layers on Biaxially Textured Substrates," US Patent 6,784,139, August 31, 2004.
48. A. Goyal, R. Williams and D. M. Kroeger, "Biaxially Textured Articles Formed by Powder Metallurgy," US Patent 6,790,253, September 14, 2004.
49. A. Goyal, R. Williams and D. M. Kroeger, "Biaxially Textured Articles Formed by Powder Metallurgy," US Patent 6,797,030, September 28, 2004.
50. A. Goyal, R. Williams and D. M. Kroeger, "Biaxially Textured Articles Formed by Powder Metallurgy," US Patent 6,846,344, January 25, 2005.
51. A. Goyal, "Semiconductor Films on Iridium Substrates," US Patent 6,872,988, March 29, 2005.
52. A. Goyal, R. Williams and D. M. Kroeger, "Biaxially Textured Articles Formed by Powder Metallurgy," US Patent 6,890,369, May 10, 2005.
53. A. Goyal, R. Williams and D. M. Kroeger, "Biaxially Textured Articles Formed by Powder Metallurgy," US Patent 6,902,600, June 07, 2005.
54. A. Goyal, R. Williams and D. M. Kroeger, "Biaxially Textured Articles Formed by Powder Metallurgy," US Patent Application Pending, Divisional XI.
55. A. Goyal, R. Williams and D. M. Kroeger, "Biaxially Textured Articles Formed by Powder Metallurgy," US Patent Application Pending, Divisional XII.
56. A. Goyal, R. Williams and D. M. Kroeger, "Biaxially Textured Articles Formed by Powder Metallurgy," US Patent Application Pending, Divisional XIII.
57. A. Goyal, "Textured Substrate and Devices Thereof," US Patent 7,087,113, Aug. 08, 2006.
58. A. Goyal, "Doped Y2O3 buffer layers for laminated conductors," US Patent 7,258,928, August 21, 2007.
59. A. Goyal, "Conductive and robust nitride buffer layers on biaxially textured substrates," US Patent 7,510,997, March 31, 2009.
60. A. Goyal, "Doped LZO buffer layers for laminated conductors," US Patent 7,683,010, March 23, 2010.
61. A. Goyal, "Strong, non-magnetic, cube textured alloy substrates," US Patent

- 7,879,161, February 1, 2011.
62. A. Goyal, "Semiconductor-based, large-area, flexible, electronic devices," US Patent 7,906,229, March 15, 2011.
 63. A. Goyal, "Superconductor films with improved flux pinning and reduced AC losses," US Patent 7,919,435, April 5, 2011.
 64. A. Goyal, "High performance devices enabled by epitaxial, preferentially oriented, nanodots and/or nanorods," US Patent 8,034,745, October 11, 2011.
 65. A. Goyal, "High performance electrical, magnetic, electromagnetic and electrooptical devices enabled by three dimensionally ordered nanodots and nanorods," US Patent 8,119,571, February 21, 2012.
 66. A. Goyal, "{100}<100> or 45°-rotated {100}<100>, semiconductor-based, large-area, flexible, electronic devices," US Patent 8,178,221, May 15, 2012.
 67. A. Goyal and C. Blue, "Composite biaxially textured substrates using ultrasonic consolidation," US Patent 8,210,420, July 3, 2012.
 68. A. Goyal, "Faceted ceramic fibers, tapes or ribbons and epitaxial devices therefrom," US Patent 8,227,082, July 24, 2012.
 69. A. Goyal and C. Blue, "Composite biaxially textured substrates using ultrasonic consolidation," US Patent 8,424,745, April 23, 2012.
 70. A. Goyal, "Faceted ceramic fibers, tapes or ribbons and epitaxial devices therefrom," US Patent 8,481,460, July 9, 2013.
 71. A. Goyal, "Structures with three dimensional nanofences comprising single crystal segments," US Patent 8,518,526, August 27, 2013.
 72. A. Goyal, "High performance superconducting devices enabled by three dimensionally ordered nanodots and/or nanorods," US Patent 8,536,098, September 17, 2013.
 73. A. Goyal, "High performance superconducting devices enabled by three dimensionally ordered nanodots and/or nanorods," US Patent 8,536,098, September 9, 2013.
 74. A. Goyal and Jusnoo Shin, "Nanocomposites for ultra high density information storage, devices including the same, and methods of making the same," US Patent 8,685,549, April 01, 2014.
 75. A. Goyal and S. H. Wee, "Buffer layers for REBCO films for use in superconducting devices," US Patent 8,748,350, June 10, 2014.
 76. A. Goyal, M. Paranthaman and S. H. Wee, "Chemical solution seed layer for rabbits tapes," US Patent 8,748,349, June 10, 2014.
 77. A. Goyal, "Semiconductor-based, large-area, flexible, electronic devices on {110}<100> oriented substrates," US Patent 8,795,854, August 5, 2014.
 78. A. Goyal, "[100] or [110] aligned, semiconductor-based, large-area, flexible, electronic devices," US Patent 8,987,736, March 24, 2015.
 79. A. Goyal, "Polycrystalline ferroelectric or multiferroic oxide articles on biaxially textured substrates and methods for making same," US Patent 8,993,092, March 31, 2015.
 80. A. Goyal and D. M. Kroeger, "Method of Forming Biaxially Textured Articles by Physical Vapor Deposition," ORNL/LMER Docket ERID No. 374, Invention disclosure filed.
 81. D. P. Norton, A. Goyal and C. Park, "Buffer Architecture for Biaxially Textured Structures and Method of Fabricating Same," ORNL/LMER Docket ERID 0726, US Patent Application Pending, Divisional I.
 82. S. Sambasivan, A. Goyal, S. A. Barnett, I. Kim, D. M. Kroeger, "Conductive and Robust Nitride Buffer Layers on Biaxially Textured Substrates," US Patent 7510997, issued 3/31/2009.
 83. A. Goyal, "A Textured, Near Single-Crystal-Like Buffered Substrate and Devices Thereof", ORNL/UT-Battelle Docket ERID 0963, US Patent Application Pending.
 84. A. Goyal, "Method of Fabricating Crystalline, Epitaxial Diamond Films on Iridium Substrates," US Patent Application Pending.
 85. M. Paranthaman, A. Goyal, D. M. Kroeger and F. A. List, "Method for Making

Buffer Layers on Rolled Ni or Cu as Superconductor Substrates,” US Patent Application Pending, Divisional I.

86. A. Goyal, D. M. Kroeger and M. Paranthaman, “Method of Fabricating TI-Containing Conductors,” ORNL/LMER Docket ESID No. 1852-X, Invention disclosure filed.
87. A. Goyal, and D. M. Kroeger, “Method of Enhancing Intragranular Superconducting Properties by Controlled Addition of Pinning Centers,” ORNL/LMER Docket ESID No. 1853-X, Invention disclosure filed.
88. A. Goyal and D. M. Kroeger, “Method of Forming TI-1223 Precursors,” ORNL/LMER Docket ESID No. 1867-X, Invention disclosure filed.
89. A. Goyal, S. A. David and D. M. Kroeger, “Method of Forming Joints in Biaxially Textured Metals”, ORNL/LMER Docket ERID 0758, Invention disclosure filed.
90. A. Goyal and D. M. Kroeger, “Method to Fabricating Polycrystalline, HTS Conductors with Reduced Weak-link Effects at Grain Boundaries”, ORNL/LMER Docket ERID 0757, Invention disclosure filed.
91. A. Goyal and D. M. Kroeger, “Method to Form Superconducting Wire for AC Applications”, ORNL/LMER Docket ERID 0826, Invention disclosure filed.
92. A. Goyal, “A Textured, Near Single-Crystal-Like Buffered Substrate and Devices Thereof”, ORNL/UT-Battelle Docket ERID 0964, Invention disclosure filed.
93. A. Goyal, "Method of Fabricating a Textured, Buffered Substrate and Article Formed Thereby," ORNL/UT-Battelle Docket ERID 0871, Invention disclosure filed.
94. A. Goyal, "Method and Article of Fabricating a Substrate which has an Extremely Sharp Biaxial Texture and Article formed Thereby," ORNL/UT-Battelle Docket ERID 0873, Invention disclosure filed.
95. A. Goyal, "Method and Article of Fabricating a Substrate which has an Extremely Sharp Biaxial Texture and Article formed Thereoff," ORNL/UT-Battelle Docket ERID 0874, Invention disclosure filed.
96. A. Goyal, "A Textured, Buffered Substrate and Devices Thereon," ORNL/UT-Battelle Docket ERID 0875, Invention disclosure filed.
97. A. Goyal, "Method and Article of Forming a Substrate with a Certain Microstructure for Growth of Epitaxial Oxides, Nitrides as well as Electromagnetic Device Layers such as High Temperature Superconductors," ORNL/UT-Battelle Docket ERID 0876, Invention disclosure filed.
98. A. Goyal, "Method and Article of Fabricating Powder-in-tube and Thick Film form Superconductors to get High Performance by Simple Microstructural Modification," ORNL/UT-Battelle Docket ERID 0877, Invention disclosure filed.
99. A. Goyal, "Method of Fabricating Polycrystalline Pb-alloy Electrodes Which Result in Enhanced Operating Life and Performance of Lead Acid Batteries by Grain Boundary Engineering," ORNL/UT-Battelle Docket ERID 1000, Invention disclosure filed.
100. A. Goyal, “Method to Fabricate Crystalline, Epitaxial Coatings of Oxides on Substrates,” ORNL/UT-Battelle Docket ERID 1001, Invention disclosure filed.
101. A. Goyal and D. M. Kroeger, “Method to Fabricate Biaxially Textured Articles,” ORNL/UT-Battelle Docket ERID 1002, Invention disclosure filed.
102. A. Goyal, "Method of Fabricating Epitaxial Films of Superconducting MgB₂," ORNL/UT-Battelle Docket ERID 1040, Invention disclosure filed.
103. A. Goyal, "Method of Fabricate Low Cost, Flexible, Semiconductor-based Devices," ORNL/UT-Battelle Docket ERID 1041, Invention disclosure filed.
104. A. Goyal, "Method of Fabricating Biaxially Textured Substrates," ORNL/UT-Battelle Docket ERID 1042, Invention disclosure filed.
105. A. Goyal, "Buffer Layers and Articles for Electronic Devices," ORNL/UT-Battelle Docket ERID 1043, Invention disclosure filed.
106. A. Goyal, “Method to Fabricate Epitaxial Diamond Films for a Range of Applications – 1, ORNL/UT-Battelle Docket ERID 1077, Invention disclosure submitted.
107. A. Goyal, “Method to Fabricate Epitaxial Diamond Films for a Range of

	<p>Applications – 2, ORNL/UT-Battelle Docket ERID 1078, <u>Invention disclosure submitted.</u></p> <p>108.A. Goyal, “Method to Fabricate Epitaxial Diamond Films for a Range of Applications – 3, ORNL/UT-Battelle Docket ERID 1079, <u>Invention disclosure submitted.</u></p> <p>109.A. Goyal, “Method to Fabricate Epitaxial Diamond Films for a Range of Applications – 4, ORNL/UT-Battelle Docket ERID 1080, <u>Invention disclosure submitted.</u></p> <p>110.A. Goyal, “Method to Fabricate Epitaxial Diamond Films for a Range of Applications – 5, ORNL/UT-Battelle Docket ERID 1081, <u>Invention disclosure submitted.</u></p> <p>111.A. Goyal and Y. Li, “Method to Fabricate YBCO Films via an Ex-situ Route,” ORNL/UT-Battelle Docket ERID 1112, <u>Invention disclosure submitted.</u></p> <p>112.A. Goyal and C. Thieme, “Ternary Non-Magnetic Alloy for Biaxially Textured Substrates,” ORNL/UT-Battelle Docket ERID 1129C, <u>Invention disclosure submitted.</u></p> <p>113.A. Goyal, “Method of Fabricating Ga-As Based Devices on Low-Cost Substrates Using Scalable Methods and Resulting Articles Therefrom,” ORNL/UT-Battelle Docket ERID 1082, <u>Invention disclosure submitted.</u></p> <p>114.A. Goyal, “Copper-based Substrates for Application with a Biaxially Textured Buffer Layer,” ORNL/UT-Battelle Docket ERID 1204, <u>Invention disclosure submitted.</u></p> <p>115.A. Goyal, “Textured Substrates for a Range of Applications,” ORNL/UT-Battelle Docket ERID 1205, <u>Invention disclosure submitted.</u></p> <p>116.A. Goyal, “Biaxially Textured Copper-based Substrates,” ORNL/UT-Battelle Docket ERID 1206, <u>Invention disclosure submitted.</u></p> <p>117.A. Goyal, “Method of Fabricating Copper-Based, Textured, Ternary Alloys for a Range of Applications” ORNL/UT-Battelle Docket ERID 1218, <u>Invention disclosure submitted.</u></p> <p>118.A. Goyal, “Substrate for Fabrication of Low Cost, Flexible, Semiconductor-Based Devices,” ORNL/UT-Battelle Docket ERID 1243, <u>Invention disclosure submitted.</u></p> <p>119.A. Goyal and Yongli Xu, “Fabrication of high-J_c YBCO thick films via solution processing,” ORNL/UT-Battelle Docket ERID 1358, <u>Invention disclosure submitted.</u></p> <p>120.A. Goyal, “Fabrication of solution derived epitaxial films,” ORNL/UT-Battelle Docket ERID 1362, <u>Invention disclosure submitted.</u></p> <p>121. A. Goyal, “Fabrication of round wires for epitaxial HTS,” <u>Invention disclosure submitted.</u></p> <p>122. A. Goyal, L. Heatherly, F. A. List, D. Lee, M. Paranthaman, C. Cantoni and R. Feenstra, “Simplified Buffer Stack for RABiTS,” ERID 1401, <u>Invention disclosure submitted.</u></p> <p>123. A. Goyal, “Method to Fabricate OLED’s and other Electronic Devices,” ERID 1397, <u>Invention disclosure submitted.</u></p> <p>124. A. Goyal, D. Lee, F. List and L. Heatherly, “Modified Buffer Stack for Epitaxial Superconductors on RABiTS,” ERID 1399, <u>Invention disclosure submitted.</u></p> <p>125.M. Paranthaman, U. Schoop, A. Goyal, C. Thieme, D. Verebelyi and M. Rupich, ERID 1457C, <u>Invention disclosure submitted.</u></p> <p>126.A. Goyal and S. Kang, “Method of Forming Self-Aligned Nano-Dots and Nano-Rods within a Superconductor to Enhance Properties Thereof,” ERID 1449, <u>Invention disclosure submitted.</u></p> <p>127.A. Goyal, “Graphite Fiber Reinforced Cu-alloy Composites for Overhead Transmission Line Cores,” <u>Invention disclosure submitted.</u> IDR #175.</p> <p>128. A. Goyal, “Method to Fabricate a Low Aspect Ratio Substrate for Epitaxial Growth of Materials,” <u>Invention disclosure submitted.</u> IDR #176.</p> <p>129.A. Goyal, “Novel Process for Fabrication of High Flux Density Transformer Cores,” <u>Invention disclosure submitted.</u> IDR #262.</p> <p>130.A. Goyal, “Novel Method for Fabrication of Cost Effective, High Performance Hydrogen Membrane Fuel Cells,” <u>Invention disclosure submitted.</u> IDR #269.</p>
--	---

- 131.**M. Paranthaman and A. Goyal, “Methods to improve the texture of the buffer layers for YBCO coated conductors,” Invention disclosure submitted, IDEA 05-76.
- 132.**V. Selvamanickam, M. Paranthaman and A. Goyal, “High Throughput Buffer Layers for IBAD-MgO templates without the homoepi MgO layers,” Invention disclosure submitted, IDEA 05-176.
- 133.**A. Goyal, “HTS Conductors with Controlled Grain Boundaries,” Invention disclosure submitted, IDEA 05-180.
- 134.**A. Goyal, “Epitaxial Devices on Structural Ceramic Fibers,” US Patent Application Filed, IDEA 05-179.
- 135.** A. Goyal, “Epitaxial Devices on Structural Ceramic Fibers,” PCT Patent Application Filed.
- 136.**A. Goyal, “Non-magnetic and Mechanically Strong, Cube Textured Ni-alloy for a Range of Applications,” Invention disclosure submitted, IDEA 05-200.
- 137.**A. Goyal, “Single-crystal-like Electrocaloric Device,” Invention disclosure submitted, IDEA 05-201.
- 138.**A. Goyal, “M-plane and A-plane oriented, single-crystal, structural fibers for a range of electronic applications,” Invention disclosure submitted, IDEA 05-424.
- 139.**A. Goyal, “A novel method for improving flux-pinning and possibly achieving HTS filamentization,” Invention disclosure submitted, IDEA 05-425.
- 140.**A. Goyal, “Method to make single crystal substrates for HTS applications,” Invention disclosure submitted, IDEA 05-426.
- 141.**A. Goyal, “Method to fabricate single crystal wire of metals and alloys,” Invention disclosure submitted, IDEA 05-429.
- 142.**A. Goyal, “Method to fabricate high-flux density transformer materials in the form of sheets and/or wires,” Invention disclosure submitted, IDEA 05-430.
- 143.**A. Goyal, “Vertically-Aligned, Epitaxial Nanorod Array on Flexible, Single-Crystal or Single-Crystal-Like Substrates for Nanoelectronics and Energy Conversion Applications,” Invention disclosure submitted, IDEA 05-482.
- 144.**A. Goyal and C. Blue, “Composite biaxially textured substrates using Ultrasonic Consolidation or Bonding,” Patent Application in Process, IDEA 05-590.
- 145.**A. Goyal and S. H. Wee, “Improved Method of Growing CeO₂ and YSZ Buffer Layers for YBCO HTS on SSIFFS”, Invention disclosure submitted, ID 2259, S-115,295, 2009.
- 146.**A. Goyal, S. H. Wee and J. Shin, “Phase Separated, Epitaxial, Nanostructured LMO+MgO Composite Films,” Invention disclosure submitted, ID 2258, S-115, 294, 2009.
- 147.**A. Goyal and S. H. Wee, “Three Dimensional, Biaxially-Textured Oxide Nanofence Comprising Single Crystal, MgO Nanobelt Segments,” Patent Application Submitted, ID 2243, S-115,277, 2009.
- 148.**A. Goyal and S. H. Wee, “Enhancement in Critical Current Density via Incorporation of Nanoscale Ba₂(Y,RE)TaO₆ in REBCO films,” Provisional Patent Application Submitted, ID 2286, S-115,325, 2009.
- 149.**A. Goyal and S. H. Wee, “Enhancement in Critical Current Density via Incorporation of Nanoscale Ba₂(Y,RE)NbO₆ in REBCO Films,” Provisional Patent Application Submitted, ID 2287, S-115,326, 2009.
- 150.**A. Goyal, “Cap Layer for YBCO Films for Use in Superconducting Wires,” Invention disclosure submitted, ID 2296, S-115,335, 2009.
- 151.**A. Goyal, S. H. Wee and M. Paranthaman, “Chemical Solution Seed Layer for RABiTS Tapes,” Invention disclosure submitted, ID 2297, S-115,336, 2009.
- 152.**A. Goyal, US Patent Application - US20080265255, “Semiconductor-based, large-area, flexible, electronic devices on <100> oriented substrates”.
- 153.**A. Goyal, US Patent Application - US20080230779, “[100] Or [110] aligned, semiconductor-based, large-area, flexible, electronic devices”.
- 154.**A. Goyal, US Patent Application - US20080176749, “High performance devices enabled by epitaxial, preferentially oriented, nanodots and/or nanorods”.
- 155.**A. Goyal, US Patent Application - 11/498,120, “High performance, electrical,

magnetic, electromagnetic and electro-optical devices enabled by three dimensionally ordered nanodots and nanorods”.

- 156.A. Goyal, US Patent Application - US20080217622, “Novel, semiconductor-based, large-area, flexible, electronic devices”.
- 157.A. Goyal, US Patent Application - US20090038714, “Strong, Non-magnetic, cube textured alloy substrates”.
- 158.A. Goyal, US Patent Application - US20080176749, “High performance devices enabled by epitaxial, preferentially oriented, nanodots and/or nanorods”.
- 159.A. Goyal, US Patent Application – 11/498,120, “High performance, electrical, magnetic, electromagnetic and electro-optical devices enabled by three dimensionally ordered nanodots and nanorods”.
160. “Superconductor Films with Improved Flux-pining and Reduced Ac Losses,” PCT application filed, WIPO Patent Application WO/2010/044928.
161. “Faceted Ceramic Fibers, Tapes or Ribbons and Epitaxial Devices Thereform,” PCT application filed, WIPO Patent Application WO/2009/042363.
- 162.A. Goyal, US Patent Application – 12/242,021, “Superconductor films with improved flux pinning and reduced AC losses”.
- 163.A. Goyal and S.H. Wee, US Patent Application – 12/711309, “Structures with Three Dimensional Nanofences Comprising Single Crystal Segments”.
- 164.A. Goyal, S.H. Wee, C. Cantoni and E. Specht, US Patent Application – 12/850,398, “Critical current density enhancement via incorporation of nanoscale Ba₂(Y,RE)NbO₆ in REBCO films”.
- 165.A. Goyal, S.H. Wee, C. Cantoni and E. Specht, US Patent Application – 12/850,521, “Critical current density enhancement via incorporation of nanoscale Ba₂(Y,RE)TaO₆ in REBCO films”.
- 166.A. Goyal, US Patent Application – 12/849,970, “Vertically-aligned nanopillar array on flexible, biaxially-textured substrates for nanoelectronics and energy conversion applications”.
- 167.A. Goyal, US Patent Application – 12/011,450, “<100> or 45 degrees-rotated <100>, semiconductor-based, large-area, flexible, electronic devices”.
- 168.A. Goyal, US Patent Application – 13/136,357, “High performance superconducting devices enabled by three dimensionally ordered nanodots and/or nanorods”.
- 169.A. Goyal and Junsoo Shin, US Patent Application – 12/956598, “Nanocomposites for ultra high density information storage, devices including the same, and methods of making the same”.
- 170.A. Goyal, US Patent Application – 13/030260, “Polycrystalline ferroelectric or multiferroic oxide articles on biaxially textured substrates and methods for making same”.
- 171.A. Goyal, US Patent Application – 13/088,179, “Buffer layers for REBCO films for use in superconducting films”.
- 172.A. Goyal, US Patent Application – 13/088,182, “Chemical solution seed layer for RABITS tapes”.
- 173.A. Goyal, US Patent Application – 13/529,410, “Faceted Ceramic Fibers, Tapes or Ribbons and Epitaxial Devices Thereform”.
- 174.A. Goyal and C. Blue, “Composite biaxially textured substrates using ultrasonic consolidation,” PCT application filed, WIPO Patent Application WO/2012/106196.
- 175.A. Goyal and S. H. Wee, “Critical current density enhancement via incorporation of nanoscale Ba₂(Y,RE)TaO₆ in REBCO films, WIPO Patent Application WO/2011/017454.
- 176.A. Goyal and S. H. Wee, “Critical current density enhancement via incorporation of nanoscale Ba₂(Y,RE)NbO₆ in REBCO films, WIPO Patent Application WO/2011/017439.
- 177.A. Goyal, “Vertically-aligned nanopillar array on flexible, biaxially-textured substrates for nanoelectronics and energy conversion applications,” WIPO Patent Application WO/2011/017392.
- 178.A. Goyal, “Superconductor films with improved flux pinning and reduced AC

	<p>losses,” <u>WIPO Patent Application WO/2010/044928</u>.</p> <p>179.A. Goyal, “Semiconductor-based, large-area, flexible, electronic devices on {110}<100> oriented substrates,” <u>WIPO Patent Application WO/2009/110872</u>.</p> <p>180.A. Goyal, “[100] OR [110] aligned, semiconductor-based, large-area, flexible, electronic devices,” <u>WIPO Patent Application WO/2009/096932</u>.</p> <p>181.A. Goyal, “Semiconductor-based, large-area, flexible, electronic devices,” <u>WIPO Patent Application WO/2009/096931</u>.</p> <p>182.A. Goyal, “Semiconductor-based, large-area, flexible, electronic devices,” <u>WIPO Patent Application WO/2009/096931</u>.</p> <p>183.A. Goyal, “Semiconductor-based, large-area, flexible, electronic devices on {110}<100> oriented substrates,” <u>European Patent Application EP2266135</u>.</p> <p>184.A. Goyal, “Semiconductor-based, large-area, flexible, electronic devices,” <u>European Patent Application EP2250674</u>.</p> <p>185.A. Goyal, “Y100 OR Y110 aligned, Semiconductor-based, large-area, flexible, electronic devices,” <u>European Patent Application EP2250664</u>.</p> <p>186.A. Goyal, “Faceted Ceramic Fibers, Tapes or Ribbons and Epitaxial Devices Therefrom,” <u>European Patent Application EP2205434</u>.</p> <p>187.A. Goyal, “Scalable Fabrication of One-Dimensional and Three-Dimensional Conducting, Nanostructured Templates for Diverse Applications Such as Battery Electrodes for Next Generation Batteries,” US Patent Application Filed.</p> <ul style="list-style-type: none"> • Trademark: RABITS™ (Rolling-Assisted-Biaxially-Textured-Substrates) • Trademark: SSIFFS™ (Sapphire Single-crystal Faceted Fiber Substrates)
--	---

<p style="text-align: center;">Publications</p>	<ol style="list-style-type: none"> 1. “Optimal, Nanodefekt Configurations via Strain-Mediated Assembly for Optimized Vortex-Pinning in Superconducting Wires from 4.2K-77K”, A Goyal and S. H. Wee, Accepted for publication in Journal of Physcis, 2017. 2. “Single-Crystal-like, epitaxial GaAs thin film on flexible metal substrate for optoelectronic applications,” Gokul Radhakrishnan, Kyunghoon Kim, Ravi Droopad and Amit Goyal, Submitted to Nature Magazine’s Scientific Reports, 2017. 3. “Single-Crystal-like, epitaxial Ge Film Growth on cm-sized, biaxially-textured, Fe-based Substrates,” Kyunghoon Kim, Gokul Radhakrishnan, Ravi Droopad and Amit Goyal, Submitted to Nature Magazine’s Scientific Reports, 2017. 4. “Single-Crystal-like, epitaxial Germanium Films on Flexible, Single-Crystal-Like Substrates,” Kyunghoon Kim, Gokul Radhakrishnan, Ravi Droopad and Amit Goyal, Submitted to Advanced Functional Materials, 2017. 5. “Epitaxial Growth of Superconductors on Single-Crystal, Structural, Faceted Fibers (SSIFFS): A New Approach Towards Low-AC Loss Wire”, A. Goyal, S. H. Wee and Y. Zuev, To be submitted to Science, 2017. 6. “Heteroepitaxy of large grain Ge film on cube-textured Ni(001) foils through CaF₂ buffer layer,” Chen, Liang, Xie, Weiyu, Wang, Gwo-Ching, Bhat, Ishwara, Zhang, Shengbai, Goyal, Amit, Lu, Toh-Ming, Thin Solid Films, Vol: 603, Pages: 428-434, 2015. 7. “Heteroepitaxial Cu₂O on inexpensive, scalable, single-crystal-like metallic substrates: A potential route towards non-toxic, earth-abundant solar cells,” S. H. Wee, P. Huang, J. K. Lee and A. Goyal, Nature Magazine’s Scientific Reports, Scientific Reports 5, Article number: 16272, doi:10.1038/srep16272 (2015). 8. “Heteroepitaxy of Ge on Cube-Textured Ni(001) Foils Through CaF₂ Buffer Layer;” Chen, L., Lu, Z.-H., Lu, T.-M., Bhat, I., Zhang, S.B., Goyal, A., Zhang, L.H., Kisslinger, K. and Wang, G.-C., MRS Advances, pp. 1–6. doi: 10.1557/adv.2016.517, 2015. 9. “Epitaxial growth of Ba₂YNbO₆ films on biaxially-textured Ni-W substrates as a multifunctional single buffer layer for high J_c epitaxial YBCO film,” S. H. Wee; C.
--	---

Cantoni and A Goyal, **MRS Communications**, Volume 5, Issue 3, pp. 533-538, 2015.

10. "Robust critical current density in applied magnetic fields in 5 μ m thick, SmBa₂Cu₃O_{7- δ} based superconducting wires," A O Ijaduola, F List, H-S Kim, S-S Oh and A Goyal, **Physica C: Superconductivity and its Applications**, Volume 517, Pages 1–4, 2015.
11. "Ultra-High Performance, High-Temperature Superconducting Wires via Cost-effective, Scalable, Co-evaporation Process", Ho-Sup Kim, Sang-Soo Oh, Hong-Soo Ha, Dojun Youm, Seung-Hyun Moon, Jungho Kim, Shi Xue Dou, Yoon-Uk Heo, Sung-Hoon Wee and A. Goyal, **Nature Magazine's Scientific Reports**, 4, Article number:4744doi:10.1038/srep04744, 2014.
12. "Engineering NanoColumnar Defect Configurations for Optimized Vortex Pinning in High Temperature Superconducting Nanocomposite Film-based Wires," S. H. Wee, Y. Zuev, C. Cantoni and A. Goyal, **Nature Magazine's Scientific Reports**, 3, Article number: 2310 (2013).
13. "Robust superconducting FeSe_{0.5}Te_{0.5} coated conductors at 30 tesla," Weidong Si, Su Jung Han, Xiaoya Shi, Steven N. Ehrlich, J. Jaroszynski, Amit Goyal, and Qiang Li, **Nature Communications**, 4, Article number: 1347, 2013, doi:10.1038/ncomms2337.
14. "Orientational domains in metalorganic chemical vapor deposited CdTe(111) film on cube-textured Ni," G. C. Wang, L.H. Zhang, Kim Kisslinger, C. Gaire, A. Goyal, I. Bhat and T.-M. Lu, **Thin Solid Films**, 531 (2013) 217–221.
15. "Frontiers in Thin Film Epitaxy and Nanostructured Materials," J. Narayan, J. Schwartz, A. Goyal, H. Y. Wang, S. H. Jin and X. Z. Liao, **J. of Mater. Res.**, 28 (2013) 1625-1625.
16. "Strain-Modulated Self-Assembly in Nanostructured, Complex Oxide Films via Spontaneous Phase Separation and Ordering Mechanism," S. H. Wee, Y. Gao, Y. L. Zuev, K. L. More, J. Meng and A. Goyal, **Advanced Functional Materials**, doi: 10.1002/adfm.201202101, 2012.
17. "Heteroepitaxial growth of Si films on flexible metallic substrates for fabrication of low cost, high performance Si solar cells," S. H. Wee, C. Cantoni, T. Fanning, J. Bornstein, D. F. Bogorin, M. Paranthaman and A. Goyal, **Energy & Environmental Science (EES)**, 5 (2012) 6052-6056.
18. C. Gaire, J. Palazzo, A. Goyal, G. C. Wang and T. M. Lu, "Low temperature epitaxial growth of Ge on cube-textured Ni," **J. of Crys. Growth**, 343 (2012) 33-37.
19. "Phase Stability of Cubic Pyrochlore Rare Earth Tantalate Pinning Additives in YBa₂Cu₃O_{7-x} Superconductor," S. H. Wee, C. Cantoni, Y. L. Zuev, E. D. Specht, and A. Goyal, **J. of Am. Cer. Soc.**, 95 (2012) 1174-1177.
20. C. Gaire, S. Rao, M. Riley, L. Chen, A. Goyal, S. Lee, I. Bhat, T. M. Lu, and G. C. Wang, "Epitaxial growth of CdTe thin film on biaxially textured Ni substrate," **Thin Solid Films**, 520 (2012) 1862-1865.
21. "Critical currents, magnetic relaxation and pinning in NdBa₂Cu₃O_{7-delta} films with BaZrO₃-generated columnar defects," Ijaduola, AO, Wee, SH, Goyal, A, Martin, PM, Li, J, Thompson, JR, Christen, DK, **Supercond. Sci & Tech.**, 25, Article No. 045013, 2012.
22. "Nanotechnologies to enable high-performance superconductors for energy applications", C. Cantoni and A. Goyal to be published in second edition of book titled "**Nanotechnology for the Energy Challenge**" by Wiley-VCH, 2013, edited by J. Garcia, Spain.
23. "Structural engineering of epitaxial, self-assembled ferromagnetic cobalt/yttria-stabilized zirconia nanocomposites for ultrahigh-density storage media," J. Shin, A. Goyal, C. Cantoni, J. W. Sinclair, and J. R. Thompson, **NanoTechnology**, 23, Article No. 155602, 2011.

24. "Triangular Graphene Grain Growth on Cube-textured Cu Substrates," J. Liu, J. Wu, C. M. Edwards, C. L. Berrie, D. Moore, Z. Chen, V. A. Maroni, M. Paranthaman, and A. Goyal, **Advanced Functional Materials**, 21 (2011.) 3868-3874
25. "Strain-driven Oxygen Deficiency in Self-assembled, Nanostructured, Composite Oxide Films," C. Cantoni, Y. F. Gao, S. H. Wee, E. D. Specht, J. Gazquez, J. Y. Meng, S. J. Pennycook and A. Goyal, **ACS Nano**, 2011, 5 (6), pp 4783–4789.
26. "Polarization manipulation via orientation control in heteroepitaxial BiFeO₃ thin films on biaxially textured, flexible metallic tapes," J. Shin, A. Goyal, S. Jesse, and L. Heatherly, **Appl. Phys. Exp.**, Vol.: 4, Issue: 2, Article Number: 021501, DOI: 10.1143/APEX.4.021501, 2011.
27. "Formation of Stacking Faults and Their Correlation with Flux Pinning and Critical Current Density in Sm-doped YBa₂Cu₃O_{7-x} Films," S. H. Wee, E. D. Specht, C. Cantoni, Y. L. Zuev, V. Maroni, W. Wong-Ng, G. Liu, T. J. Haugan, and A. Goyal, **Phys. Rev. B**, 83, 224520 (2011).
28. "Grain boundary networks in high-performance, heteroepitaxial, YBCO films on polycrystalline, cube-textured metals," A. Goyal, D. P. Field, R. Held and J. Mannhart, **Phil. Mag.**, 91 (2011) 246-255.
29. "Formation of Self-Assembled, Double-Perovskite, Ba₂YNbO₆ Nanocolumns and Their Contribution to Flux-Pinning and J_c in Nb-Doped YBa₂Cu₃O_{7-δ} Films," S. H. Wee, A. Goyal, Y. L. Zuev, C. Cantoni, V. Selvamanickam, and E. D. Specht, **Appl. Phys. Exp.**, 3 (2010) 023101.
30. "Enhanced Flux Pinning and Critical Current Density via Incorporation of Self-assembled Rare-earth Barium Tantalate Nanocolumns within YBa₂Cu₃O_{7-δ} films," S. H. Wee, A. Goyal, Amit, E. D. Specht, C. Cantoni, Y. L. Zuev, V. Selvamanickam, S. Cook, **Physical Review B**, vol. 81, Issue 14, id. 140503, 2010.
31. "Multifunctional, phase separated, BaTiO₃+CoFe₂O₄ cap buffer layers for improved flux-pinning in YBa₂Cu₃O_{7-δ} based coated conductors," S. H. Wee, J. Shin, C. Cantoni, Y. L. Zuev, S. Cook, and A. Goyal, **Supercond. Sci. Technol.** 23 (2010) 014007.
32. "Enhanced flux pinning in MOCVD-YBCO films through Zr additions: systematic feasibility studies," T. Aytug, M. Paranthaman, E. D. Specht, Y. Zhang, K. Kim, Y. L. Zuev, C. Cantoni, A. Goyal, D. K. Christen, V. A. Maroni, Y. Chen and V. Selvamanickam, **Supercond. Sci. Technol.**, 23 014005, 2010.
33. "Modified Lanthanum Zirconium Oxide buffer layers for low-cost, high performance YBCO coated conductors," M. Paranthaman, S. Sathyamurthy, Xiaoping Li, E.D. Specht, S.H. Wee, C. Cantoni, A. Goyal, M.W. Rupich, **Physica C**, 470 (2010) 352–356.
34. "An evaluation of phase separated, self-assembled LaMnO₃-MgO nanocomposite films directly on IBAD-MgO as buffer layers for flux pinning enhancements in YBa₂Cu₃O_{7-delta} coated conductors," O. Polat, T. Aytug, M. P. Paranthaman, K. J. Leonard, A. R. Lupini, S. J. Pennycook, H. M. Meyer, K. Kim, X. F. Qiu, S. Cook, J. R. Thompson, D. K. Christen, A. Goyal, X. M. Xiong, V. Selvamanickam, **J. of Mater. Res.**, 25 (2010) 437-443.
35. "Nanotechnology for Superconductors from the Energy Perspective ", C. Cantoni and A. Goyal published in book titled "**Nanotechnology for the Energy Challenge**" by Wiley-VCH, 2010, edited by J. Garcia, Spain, ISBN: 978-3-527-32401-9.
36. "Enhanced and uniform in-field performance in long (Gd, Y)-Ba-Cu-O tapes with zirconium doping fabricated by metal-organic chemical vapor deposition," V. Selvamanickam, A. Guevara, Y. Zhang, I. Kesgin, Y. Xie, G. Carota, Y. Chen, J. Dackow, Y. Zhang, Y. Zuev, C. Cantoni, A. Goyal, J. Coulter, L. Civale, **Supercond. Sci. & Tech.**, 23 (2010), Article Number 014014.
37. "Enhanced flux pinning in MOCVD-YBCO films through Zr-additions: Systematic feasibility studies," Aytug, T., Paranthaman, M., Specht, E. D., Kim, K., Zhang, Y.,

- Cantoni, C., Zuev, Yuri L., Goyal, A., Christen, D. K., and Maroni, V. A., **Supercond. Sci. & Tech.**, 23 (2010) Article Number: 014005.
38. "High-T_c Superconducting Thin- and Thick-Film-Based Coated Conductors for Energy Applications," C. Cantoni and A. Goyal published in book titled "**Thin Film Metal-Oxides: Fundamentals and Applications in Electronics and Energy**" by Springer, 2010, edited by S. Ramanathan, Harvard University.
 39. "Phase-Separated, Epitaxial, Nanostructured LaMnO₃+MgO Composite Cap Layer Films for Propagation of Pinning Defects in YBa₂Cu₃O_{7-x} Coated Conductors," S. H. Wee, J. Shin, C. Cantoni, H. M. Meyer, S. Cook, Y. L. Zuev, E. D. Specht, X. M. Xiong, M. P. Paranthaman, V. Selvamanickam, A. Goyal, **Appl. Phys. Exp.**, 2 (2009) 063008.
 40. "A three-dimensional, biaxially textured oxide nanofence composed of MgO single crystal nanobelt segments," S. H. Wee, A. Goyal, K. More and E. Specht, **Nanotechnology**, 20 (2009) 215608.
 41. "Single-crystal-like, c-axis oriented BaTiO₃ thin films with high-performance on flexible metal templates for ferroelectric applications," J. Shin, A. Goyal, **Appl. Phys. Lett.**, 94 (2009), 252903.
 42. "Growth of epitaxial γ -Al₂O₃ films on rigid single-crystal ceramic substrates and flexible, single-crystal-like metallic substrates by pulsed laser deposition," J. Shin, A. Goyal, and S. H. Wee, **Thin Solid Films**, 517, Issue 19, Pages 5710-5714, Aug., 2009.
 43. "Growth of thick BaZrO₃-doped YBa₂Cu₃O_{7- δ} films with high critical currents in high applied magnetic field", S. H. Wee, A. Goyal, and Y. L. Zuev, **IEEE Trans. Supercon.**, 19, 3266, 2009.
 44. "Effects on J_c of Pining Center Morphology for Multiple-in-Line-Damage in Coated Conductor and Bulk, Melt-Textured HTS," Weinstein, R., Parks, D., Sawh, R.-P., Mayes, B., Gandini, A., Goyal, A., Chen, Y., and Selvamanickam, V., **Physica C**, 469 (2009) 2068-2076.
 45. "Magnetic field orientation dependence of flux pinning in (Gd,Y)Ba₂Cu₃O_{7-x} coated conductor with tilted lattice and nanostructures," Zhang, Y., Specht, E. D., Cantoni, C., Christen, D. K., Zuev, Y. L., Goyal, A., Sinclair, J., Thompson, J. R., Aytug, T., Paranthaman, M. P., Chen, Y., and Selvamanickam, V., **Physica C**, 469 (2009) 2044-2051.
 46. "Low-angle grain boundaries in YBa₂Cu₃O_{7- δ} with high critical current densities," R. Held, C. W. Schneider, J. Mannhart, L. F. Allard, K. L. More, and A. Goyal, **Phys. Rev. B**, 79, Article No. 014515, Jan. 2009.
 47. "Influence of oxygen deficiency on the out-of-plane tilt of epitaxial Y₂O₃ films on Ni-5%W tapes," C. Cantoni, E. D. Specht, A. Goyal, X. Li and M. Rupich, **J. of Mater. Res.**, 24 (2009) 520-525.
 48. "Enhanced flux pinning by BaZrO₃ and (Gd,Y)₂O₃ nano-structures in metal organic chemical vapor deposited GdYBCO high temperature superconductor tapes," Y. Chen, V. Selvamanickam, Y. Zhang, Y. L. Zuev, C. Cantoni, E. D. Specht, M. P. Paranthaman, T. Aytug, A. Goyal and D. Lee, **Appl. Phys. Lett.**, vol. 94, Article Number: 062513, 2009.
 49. "Deposition studies and coordinated characterization of MOCVD YBCO films on IBAD-MgO templates," Aytug T, Paranthaman M, Heatherly L, Zuev Y, Zhang Y, Kim K, Goyal A, Maroni VA, Chen Y, Selvamanickam V, **Super. Sci & Tech.**, 22, Article No. -15008, 2009.
 50. "High-T_c Superconducting Thin and Thick-Film Based Coated Conductors for Energy Applications," C. Cantoni and A. Goyal, Invited Chapter for book titled "**Thin Film Metal-Oxides: Fundamentals and Applications in Electronics and Energy**" published by Springer, 2009, edited by S. Ramanathan, Harvard University.

51. "Fabrication of epitaxial γ -Al₂O₃ and spinel NiAl₂O₄ films on SrTiO₃ by pulsed laser ablation," J. Shin, A. Goyal, K. More and S.H. Wee, **J. of Cryst. Growth**, 311, Issue 1, Pages 210-213, Dec. 2008.
52. "Tuning flux-pinning in epitaxial NdBa₂Cu₃O_{7- δ} films via engineered, hybrid nanoscale defect structures," S. H. Wee, A. Goyal, Y. L. Zuev, and C. Cantoni, **Appl. Phys. Exp.**, Vol. 1, Issue: 11, Article Number: 111702, NOV 2008.
53. "High performance superconducting wires in high applied magnetic fields via nanoscale defect engineering", S. H. Wee, A. Goyal, Y. L. Zuev, and C. Cantoni, **Supercond. Sci. Technol.**, 21, 092001, 2008.
54. "Near-isotropic performance of intrinsically anisotropic high-temperature superconducting tapes due to self-assembled nanostructures," Y. L. Zuev, D. K. Christen, S. H. Wee, A. Goyal, and S. W. Cook, **Appl. Phys. Lett.**, 93, Article no. 172512, 2008.
55. "Improved textured La₂Zr₂O₇ buffer on La₃TaO₇ seed for all-MOD Buffer/YBCO coated conductors," Paranthaman MP, Bhuiyan MS, Sathyamurthy S, Heatherly L, Cantoni C, Goyal A, **Physica C**, 468 (2008) 1587-1590.
56. "Extraction of misorientation components from the total misorientation at grain boundaries using electron diffraction in a Y_{0.9}Sm_{0.1}Ba₂Cu₃O₇ film," J. Li and A. Goyal, **J. of Am. Cer. Soc.**, 91 (2008) 3045-3051.
57. "Spatial ordering and anisotropy in surface stress domains and nanostructural evolution," Gao YF, Meng JY, Goyal A, Stocks GM, **JOM**, 60 (2008) 54-58.
58. "Epitaxial (La, Sr)TiO₃ on textured Ni-W as a conductive buffer architecture for high temperature superconducting coated conductor," Kim K, Norton DP, Christen DK, Cantoni C, Aytug T, Goyal A, **Physica C**, 468 (2008) 961-967.
59. "Superconducting wire with record performance in high applied magnetic fields via nanoscale defect engineering," S. Wee, A. Goyal, Y. Zuev and C. Cantoni, **Supercond. Sci. & Tech.**, vol. 21, Article Number: 092001, SEP 2008.
60. "Enhanced Flux-Pinning in Dy-Doped, MOD YBCO Films on RABiTS," Goyal A., Li J., Martin P. M., Gapud A., Specht E. D., Paranthaman M., Li X., Zhang W., Kodenkandath T., Rupich M. W., **IEEE Transactions on Applied Superconductivity**, Volume 17, Issue 2, Part 3, June 2007 Page(s):3340 – 3342.
61. "Fabrication of High-J_c NdBa₂Cu₃O_{7-x} and BaZrO₃-doped NdBa₂Cu₃O_{7-x} Films on RABiTS," Wee S. H., Goyal A., Martin P. M., Li J., Paranthaman M., and Heatherly L., **IEEE Transactions on Applied Superconductivity**, Volume 17, Issue 2, Part 3, June 2007 Page(s):3672 – 3674.
62. "Slot Die Coating and Conversion of LZO on Rolling Assisted Biaxially Textured Ni-W Substrates With and Without a Very Thin Seed Layer in Low Vacuum," Heatherly L., Hsu H., Wee S. H., Li J., Sathyamurthy S., Paranthaman M., and Goyal A., **IEEE Transactions on Applied Superconductivity**, Volume 17, Issue 2, Part 3, June 2007 Page(s):3417 – 3419.
63. "MOD Buffer/YBCO Approach to Fabricate Low-Cost Second Generation HTS Wires," Paranthaman M. P., Sathyamurthy S., Bhuiyan M. S., Martin P. M., Aytug T., Kim K., Fayek M., Leonard K. J., Li J., Goyal A., Kodenkandath T., Li X., Zhang W., Rupich M. W., **IEEE Transactions on Applied Superconductivity**, Volume 17, Issue 2, Part 3, June 2007 Page(s):3332 – 3335.
64. "Control of Flux Pinning in MOD YBCO Coated Conductor," Zhang W., Huang Y., Li X., Kodenkandath T., Rupich M. W., Schoop U., Verebelyi D. T., Thieme C. L. H., Siegal E., Holesinger T. G., Maiorov B., Civale L., Miller D. J., Maroni V. A., Li J., Martin P. M., Specht E. D., Goyal A., Paranthaman M. P., **IEEE Transactions on Applied Superconductivity**, Volume 17, Issue 2, Part 3, June 2007 Page(s):3347 – 3350.
65. "Flux-pinning characteristics as a function of density of columnar defects comprised of self-assembled nanodots and nanorods in epitaxial YBa₂Cu₃O_x films for coated

conductor applications,” S. Kang, A. Goyal, J. Li et al., **Physica C-Superconductivity and its Applications**, Vol. 457, Issue: 1-2, Pages: 41-46, JUN 15 2007.

66. “Local epitaxy of $\text{YBa}_2\text{Cu}_3\text{O}_x$ on polycrystalline Ni measured by x-ray microdiffraction,” E.D. Specht, A. Goyal A and W. Liu, **J. of Mater. Res.**, Vol. 22, Issue: 3, Pages: 664-674, Mar. 2007.
67. “Strong enhancement of flux pinning in $\text{YBa}_2\text{Cu}_3\text{O}_x$ multilayers with columnar defects comprised of self-assembled BaZrO_3 nanodots,” S. Kang, K. J. Leonard, P. M. Martin, J. Li and A. Goyal, **Supercond. Sci & Tech.**, Vol. 20, Issue: 1, Pages: 11-15, Jan. 2007.
68. “Electrical properties of epoxy resin based nano-composites,” Enis Tuncer, Isidor Sauers, D Randy James, Alvin R Ellis, M Parans Paranthaman, Tolga Aytug, Srivatsan Sathyamurthy, Karren L More, Jing Li and Amit Goyal, **Nanotechnology**, vol. 18, 025703-025710, Jan. 17, 2007.
69. “Formation of high-quality, epitaxial $\text{La}_2\text{Zr}_2\text{O}_7$ layers on biaxially textured substrates by slot-die coating of chemical solution precursors,” Wee SH, Goyal A, Hsu H, **J. of Am. Cer. Soc.**, 90 (2007) 3529-3535.
70. “Low-Cost, High-Performance, Epitaxial Ceramic Films on Artificial Substrates for Energy and Electronic Applications,” A. Goyal, in **Global Roadmap for Ceramic and Glass Technology**, edited by S. Freiman, published by Wiley, ISBN: 978-0-470-10491-0, pages 891-902, June 2007.
71. “Superconducting YBCO Conductors: The RABiTS Approach,” A. Goyal, chapter in encyclopedia titled “**Encyclopedia of Materials: Science and Technology**” edited by K. H. Jürgen Buschow, Robert W. Cahn, Merton C. Flemings, Bernard Ilshner (print), Edward J. Kramer, Subhash Mahajan, and Patrick Veyssi re, published by Elsevier, 2009, ISBN: 978-0-08-043152-9.
72. “Massive Enhancements in pinning via columnar defects comprised of self-aligned BZO nanodots,” A. Goyal, S. Kang, and J. Li, **Invited book chapter**, published in book titled “**Flux Pinning and AC loss Studies on YBCO Coated Conductors**” edited by M. Parans Paranthaman and Venkat Selvamanickam, published by Nova Science Publishers, 2007.
73. “Special section: Superconducting wires and tapes – Foreword,” Paranthaman MP, Selvamanickam V, Matsumoto K, Gianni L, Zhang W, Goyal A, Wong-Ng W, **J. Elect. Mater.**, 36 (2007) 1229.
74. “Epitaxial growth of High- J_c $\text{NdBa}_2\text{Cu}_3\text{O}_x$ films on RABiTS by pulsed laser deposition,” Wee SH, Goyal A, Li J, **J. Elect. Mater.**, 36 (2007) 1230-1233.
75. “Strong enhancement of flux pinning in thick $\text{NdBa}_2\text{Cu}_3\text{O}_x$ films grown on ion-beam assisted deposition-MgO templates via three-dimensional self-assembled stacks of BaZrO_3 nanodots,” Wee SH, Goyal A, Li J, Zuev YL, Cook S, **J. of Appl. Phys.**, 102 (2007) Article No. 063906.
76. “Enhancement of dielectric strength in nanocomposites,” Tuncer E, Sauers I, James DR, Ellis AR, Paranthaman MP, Goyal A, More KL, **Nanotechnology**, 18 (2007) Article Number: 325704.
77. “The incorporation of nanoscale columnar defects comprised of self-assembled BaZrO_3 nanodots to improve the flux pinning and critical current density of $\text{NdBa}_2\text{Cu}_3\text{O}_x$ films grown on RABiTS,” Wee SH, Goyal A, Li J, Zuev YL, Cook S, Heatherly L, **Supercond. Sci. & Tech.**, 20 (2007) 789-793.
78. “Analysis of flux pinning in $\text{YBa}_2\text{Cu}_3\text{O}_x$ films by nanoparticle-modified substrate surfaces,” T. Aytug, M. Paranthaman, K. J. Leonard, S. Kang S, P. M. Martin PM, L. Heatherly, A. Goyal, A. O. Ijaduola, J. R. Thompson, D. K. Christen, R. Meng, I. Rusakova and C. W. Chu, **Phys. Rev. B**, Vol. 74 Issue: 18 Article Number: 184505, Nov.2006.
79. “Stacking faults in $\text{YBa}_2\text{Cu}_3\text{O}_x$: Measurement using x-ray diffraction and effects on critical current,” E. D. Specht, A. Goyal, J. Li et al., **Appl. Phys. Lett.**, Vol. 89,

Issue 16, Article Number: 162510, Oct. 16 2006.

80. "Strong flux-pinning in epitaxial NdBa₂Cu₃O_{7-δ} films with columnar defects comprised of self-assembled nanodots of BaZrO₃," S. H. Wee, A. Goyal, P. M. Martin et al., **Supercond. Sci & Tech.**, Vol. 19, Issue 10, Pages: L42-L45. Oct. 2006.
81. "All MOD buffer/YBCO approach to coated conductors," M. Paranthaman, S. Sathyamurthy, L. Heatherly, P. M. Martin, A. Goyal, T. Kodenkandath X. Li, C. L. H. Thieme and M. W. Rupich, **Physica C-Superconductivity and its Applications**, Vol. 445, Pages: 529-532 Oct. 1 2006.
82. "Method to separate in-plane and out-of-plane misorientation from the total misorientation at grain boundaries in polycrystalline YBCO films," J. Li and A. Goyal, published in the **Proceedings of the Microscopy Society of America**, July 30-Aug 6, 2006, Chicago, IL.
83. "High Performance High-T_c Superconducting Wires," S. Kang, A. Goyal, J. Li, A. Gapud, P. M. Martin, J. R. Thompson, D. K. Christen, F. A. List, M. Paranthaman and D. F. Lee, **Science**, vol. 311, pgs. 1911-1914, March 31st issue, 2006.
84. "Extended BaZrO₃ Nanodot Columns in Thick YBa₂Cu₃O_{7-δ} Film," J. Li, S. Kang and A. Goyal, published in the **Proceedings of the Microscopy Society of America**, July 30-Aug 6, 2006, Chicago, IL.
85. "Processing Dependence of Texture, and Critical Properties of YB₂Cu₃O_{7-δ} Films on RABiTS Substrates by a Non-fluorine MOD Method," Y. Xu, A. Goyal, K. J. Leonard, E. D. Specht, D. Shi and M. Paranthaman, **J. Am. Cer. Soc.**, 89 (2006) 914-920.
86. "Stacking faults in YBCO: measurement by x-ray diffraction and effects on critical current," E. D. Specht, A. Goyal, J. Li, P. M. Martin, X. Li and M. Rupich, **Appl. Phys. Lett.**, 89 (16): Art. No. 162510 OCT 16 2006.
87. "High in-field critical current densities in epitaxial NdBa₂Cu₃O_{7-δ} thin films on RABiTS by pulsed laser deposition," S. H. Wee, A. Goyal, P. M. Martin and L. Heatherly, **Supercond. Sci. Technol.**, 19, 865-868, 2006.
88. "Strong Flux-Pinning in Epitaxial Nd-123 films with Columnar Defects Comprised of Self-assembled Nanodots of BZO," S. H. Wee, A. Goyal, P. M. Martin, J. Li, M. Paranthaman and L. Heatherly, **Supercond. Sci. Technol.**, 19, L42-L45, 2006.
89. "Solution Processed Lanthanum Zirconium Oxide as a Primary Barrier Layer for High-I_c Coated Conductors," S. Sathyamurthy, M. Paranthaman, L. Heatherly, P. M. Martin, E. D. Specht and A. Goyal, **J. of Materials Research**, 21 (2006) 910-914.
90. "Deposition of Rare Earth Tantalate Buffers on Textured Ni-W Substrates for YBCO Coated Conductor Using CSD," M. S. Bhuiyan, M. Paranthaman, A. Goyal, L. Heatherly and D. Beach, **J. of Materials Research**, 21 (2006) 767-773.
91. "Enhancements of Flux-pinning in YBa₂Cu₃O_{7-δ} Films via Nanoscale Modification of Substrate Surfaces," T. Aytug, D.K. Christen, M. Paranthaman, A.A. Gapud, H.M. Christen, S. Kang, M. Varela, K.J. Leonard, A. Goyal, P.M. Martin, J.R. Thompson, A. O. Ijaluola, R. Meng, I. Rusakova, C.W. Chu, T.H. Johansen and S.W. Chan, Invited book chapter, to be published in book titled "**Flux Pinning and AC loss Studies on YBCO Coated Conductors**" edited by M. Parans Paranthaman and Venkat Selvamanickam, published by Nova Science Publishers, 2007.
92. "Mechanical Properties of Pure Ni and Ni-Alloy Substrate Materials for Y-Ba-Cu-O Coated Conductors," C. C. Clickner, J. W. Ekin, N. Cheggour, C. L. H. Thieme, Y. Qiao, Y. Y. Xie and A. Goyal, **Cryogenics**, 46 (2006) 432-438.
93. "A Perspective on Conducting Oxide Buffers for Cu based YBCO Coated Conductors, K. Kim, M. Paranthaman, D. P. Norton, C. Cantoni and A. Goyal, **Superconductor Sci. & Tech.**, 19 (2006) R23-R29.
94. "Enantiospecific Electrodeposition of Chiral CuO Films on Cu(001) Rolling Assisted Biaxially Textured Substrates," Jay Switzer and A. Goyal, **Chemistry of**

Materials, 2006.

95. "Electrodeposition of CuO Epitaxial Films on Cu (100) Rolling-Assisted Biaxially Textured Substrates," R. Liu, E. W. Bohannon, E. A. Kulp, G. S. Hemanth, J. A. Switzer and A. Goyal, **Physica C**, 2006.
96. "Strong Flux-pinning in YBCO Films by Columnar Defects Comprised of Self-assembled Nanodots and Nanorods," A. Goyal, S. Kang, K. Leonard, P. Martin, A. Gapud, M. Varela, M. Paranthaman, I. Ijadoula, J. Thompson, D. Christen, S. Pennycook and F. A. List, **Supercond. Sci. Tech.**, 18 (2005) 1533-1538.
97. "Assessment of chemical solution synthesis and properties of Gd₂Zr₂O₇ thin films as buffer layers for second generation high-temperature superconductor wires," T. Aytug, M. Paranthaman, K.J. Leonard, H.Y. Zhai, M.S. Bhuiyan, E.A. Payzant, A. Goyal, S. Sathyamurthy, D.B. Beach, P.M. Martin, D.K. Christen, X. Li, T. Kodenkandath, U. Schoop, M.W. Rupich, H. E. Smith, T. Haugan and P. N. Barnes, **J. of Mater. Res.**, 20 (2005) 2988-2996.
98. "Long-range Current Flow and Percolation in RABiTS-type conductors and the relative importance of out-of-plane and in-plane Misorientations in determining J_c," A. Goyal, N. Rutter, C. Cantoni and D. F. Lee, **Physica C**, 426 (2005) 1083-1090.
99. "Pulsed Electron Deposition of Fluorine-based Precursors for YBCO Coated Conductors," H. M. Christen, D. F. Lee, F. A. List, S. W. Cook, K. J. Leonard, L. Heatherly, P. Martin, M. Paranthaman, A. Goyal and C. M. Rouleau, **Superconductor Sci. & Tech.**, Volume 18, Number 9, September 2005, pp. 1168-1175(8).
100. "Growth of YBCO Films on MgO-based Rolling-assisted-biaxially-textured substrates," M. Paranthaman, T. Aytug, H. Y. Zhai, L. Heatherly, A. Goyal and D. K. Christen, **Supercond. Sci & Tech.**, 18 (2005) 223-228.
101. "R&D of RABiTS-based Coated Conductors: Conversion of Ex-Situ YBCO Superconductor Using a Novel Pulsed Electron-Beam Precursor," D. F. Lee, H. M. Christen, F. A. List, L. Heatherly, K. J. Leonard, C. M. Rouleau, S. W. Cook, P. M. Martin, M. Paranthaman and A. Goyal, **Physica C**, 426 (2005) 878-886.
102. "High critical current YBa₂Cu₃O_{7-x} thick films on rolling-assisted biaxially textured substrates," S. Kang, A. Goyal, N. Rutter, K. Leonard and D. Kroeger, **Journal of the American Ceramic Society**, Volume 88, Issue 10, Page 2677-2680, Oct 2005.
103. "Deposition of (Y₂BaCuO₅/YBa₂Cu₃O_{7-x})_xN multilayer films on Ni-based textured substrates," T. Haugan, P. N. Barnes, T. A. Campbell, A. Goyal, A. Gapud, S. Kang and L. Heatherly, **Physica C**, 425 (1-2): 21-26 SEP 1 2005.
104. "Second generation HTS wire based on RABiTS substrates and MOD YBCO," Schoop U, Rupich MW, Thieme C, Verebelyi DT, Zhang W, Li X, Kodenkandath T, Nguyen N, Siegal E, Civale L, Holesinger T, Maiorov B, Goyal A, Paranthaman M, **IEEE Transactions on Applied Superconductivity**, 15 (2): 2611-2616 Part 3, JUN 2005
105. "Liquid phase enhanced hybrid MOD approach for high performance YBCO films development," Xu Y, Goyal A, Leonard K, Heatherly L, Martin P, **IEEE Transactions on Applied Superconductivity**, 15 (2): 2617-2619 Part 3, JUN 2005
106. "Improved YBCO coated conductors using alternate buffer architectures," Paranthaman MP, Sathyamurthy S, Bhuiyan MS, Goyal A, Kodenkandath T, Li X, Zhang W, Thieme CLH, Schoop U, Verebelyi DT, Rupich MW, **IEEE Transactions on Applied Superconductivity**, 15 (2): 2632-2634 Part 3, JUN 2005.
107. "Low-pressure conversion studies for YBCO precursors derived by PVD and MOD methods," List FA, Clem PG, Heatherly L, Dawley JT, Leonard KJ, Lee DF, Goyal A, **IEEE Transactions on Applied Superconductivity**, 15 (2): 2656-2658 Part 3, JUN 2005.
108. "Solution deposition approach to high J(c) coated conductor fabrication," Sathyamurthy S, Paranthaman M, Bhuiyan MS, Payzant EA, Lee DF, Goyal A, Li

X, Kodenkandath T, Schoop U, Rupich M, **IEEE Transactions on Applied Superconductivity**, 15 (2): 2974-2976 Part 3, JUN 2005.

109. Iridium: An oxygen diffusion barrier and a conductive seed layer for RABiTS-based coated conductors,” Aytug T, Paranthaman M, Zhai HY, Leonard KJ, Gapud AA, Thompson JR, Martin PM, Goyal A, Christen DK, **IEEE Transactions on Applied Superconductivity**, 15 (2): 2977-2980 Part 3, JUN 2005.
110. “Investigation of TiN seed layers for RABiTS architectures with a single-crystal-like out-of-plane texture,” Cantoni C, Goyal A, Schoop U, Li X, Rupich MW, Thieme C, Gapud AA, Kodenkandath T, Aytug T, Paranthaman M, Kim K, Budai JD, Christen DK, **IEEE Transactions on Applied Superconductivity**, 15 (2): 2981-2984 Part 3, JUN 2005.
111. (La, Sr)TiO₃ as a conductive buffer for high-temperature superconducting coated conductors,” Kim K, Norton DP, Cantoni C, Aytug T, Gapud AA, Paranthaman MP, Goyal A, Christen DK, **IEEE Transactions on Applied Superconductivity**, 15 (2): 2997-3000 Part 3, JUN 2005.
112. “High performance YBCO films by the hybrid of non-fluorine yttrium and copper salts with Ba-TFA,” Xu Y, Goyal A, Leonard K, Martin P, **Physica C**, 421 (1-4): 67-72 MAY 1 2005.
113. “Epitaxial growth of solution-based rare-earth niobate, RE₃NbO₇, films on biaxially textured Ni-W substrates,” Paranthaman M, Bhuiyan MS, Sathyamurthy S, Zhai HY, Goyal A, Salama K, **J. of Materials Research**, 20 (1): 6-9 JAN 2005.
114. “Oxidation of carbon on nickel-based metallic substrates: Implications for high-temperature superconductor coated conductors, List FA, Heatherly L, Lee DF, Leonard KJ, Goyal A **JOURNAL OF MATERIALS RESEARCH** 20 (3): 765-773 MAR 2005.
115. “Growth of rare-earth niobate-based pyrochlores on textured Ni-W substrates with ionic radii dependency,” Bhuiyan MS, Paranthaman M, Sathyamurthy S, Goyal A, Salama K, **J. of Materials Research**, 20 (4): 904-909 APR 2005.
116. “Growth of YBCO films on MgO-based rolling-assisted biaxially textured substrates templates,” Paranthaman MP, Aytug T, Zhai HY, Heatherly L, Goyal A, Christen DK, **Supercond. Sci & Tech.** 18 (3): 223-228 MAR 2005.
117. “Epitaxial Growth of Eu₃NbO₇ Buffer Layers on Biaxially Textured Ni-W Substrates,” M. S. Bhuiyan, M. Paranthaman, D. Beach, L. Heatherly, A. Goyal, E. A. Payzant and K. Salama,” in book titled “**High-Temperature Superconductor Materials, Devices, and Applications**,” edited by M. Paranthaman, P. N. Barnes, B. Holzapfel, Y. Yamada, K. Matsumoto and J. K. F. Yao, published by the American Ceramic Society, 2005, pgs. 35-42.
118. “Perovskite Type Buffers for YBCO Coated Conductors,” M. Parans Paranthaman, T. Aytug, H.Y. Zhai, A.A. Gapud, P.M. Martin, K.J. Leonard, A. Goyal, and D.K. Christen, in “**Synthesis, Properties, and Crystal Chemistry of Perovskite-Based Materials**: Proceedings of the 106th Annual Meeting of The American Ceramic Society,” Indianapolis, Indiana, USA 2004, Ceramic Transactions, Volume 169, Winnie Wong-Ng (Editor), Amit Goyal (Editor), Ruyan Guo (Editor), Amar S. Bhalla (Editor), 2005, pgs. 49-59.
119. “Ex-Situ Conversion of Physical Vapor Deposited YBCO Precursors on RABiTS,” D. F. Lee, F. A. List, R. Feenstra, H. Christen, L. Heatherly, K. Leonard, A. Goyal and M. Paranthaman, published in the proceedings of the Workshop on **Coated Conductor & Applications** (CCA2004) held in Kanagawa, Japan, Nov. 18-20, 2004.
120. “Recent Progress in the Fabrication of RABiTS,” A. Goyal, F. A. List, N. Rutter, D. Field, L. Heatherly, T. Aytug, C. Cantoni, A. Ijadoula, J. R. Thompson, D. F. Lee, S. Cook, M. Paranthaman, K. J. Leonard, S. Kang and D. Christen, published in the proceedings of the Workshop on **Coated Conductor & Applications** (CCA2004)

held in Kanagawa, Japan, Nov. 18-20, 2004.

121. "High- J_c YBCO Superconductors on Rolling-Assisted-Biaxially-Textured-Substrates (RABiTS)," A. Goyal, M. Paranthaman and U. Schoop, invited paper, **MRS Bulletin**, Vol. 29, No.8, pp. 533-542, August 2004.
122. "Epitaxial Superconductors on Rolling-Assisted-Biaxially-Textured-Substrates (RABiTS)," A. Goyal, invited chapter in book titled "**Second generation HTS Conductors**" edited by A. Goyal, published in October, 2004 by Kluwer Academic Publishers, NY, 2004, pgs 3-22.
123. "Modeling Current Flow in Granular Superconductors," N. Rutter and A. Goyal, invited book chapter in book titled "**Studies of High Temperature Superconductors**", pp. 377-398, Springer, New York, 2004.
124. "High Performance YBCO Films by Hybrid of Non-fluorine Yttrium and Copper Salts with Ba-TFA," Y. Xu, A. Goyal and K. J. Leonard, **Physica C** 421 (1-4): 67-72, 2005.
125. "An Approach for Electrical Self-Stabilization of High Temperature Superconductors," T. Aytug, M. Parathaman, H. Zhai, A. Gapud, K. Leonard, A. Goyal, J. Thompson, and D. Christen, **Appl. Phys. Lett.**, 85 (2004) 2887-2889.
126. "Identification of a Self-limiting Reaction Layer in Ni-3at%W Rolling Assisted Biaxially Textured Substrates," K. J. Leonard, A. Goyal, S. Kang, K. A. Yarborough and D. M. Kroeger, **Supercond. Sci. & Tech.**, 17 (2004) 1295-1302.
127. "Magnetism and Ferromagnetic Loss in Ni-W Textured Substrates for Coated Conductors," A. O. Ijaduola, J. Thompson, A. Goyal, C. Thieme and K. Marken, **Physica C**, 403 (2004) 163-171.
128. "Chemical Solution Deposition of Lanthanum Zirconate Barrier Layers Applied to Low-cost Coated-conductor Fabrication," S. Sathyamurthy, M. Paranthaman, H. Y. Zhai, S. Kang, T. Aytug, C. Cantoni, K. Leonard, E. A. Payzant, H. M. Christen, A. Goyal, X. Li, U. Schoop, T. Kodenkandath and M. Rupich, **J. of Mater. Res.**, 19 (2004) 2117-2123.
129. "Effects of conversion parameters on the transport properties of YBCO films in the BaF2 ex situ process," Yoo J, Leonard KJ, Lee DF, Hsu HS, Heatherly L, List FA, Rutter NA, Goyal A, Paranthaman M, Kroeger DM, **J. of Mater. Res.**, 19 (2004) 1281-1289. (April issue)
130. "Progress in the Deposition of MgB2 Films," X. X. Xi, A. V. Pogrebnaykov, X. H. Zeng, J. M. Redwing, S. Y. Xu, Qi Li, Zi-Kui Liu, J. Lettieri, V. Vaithyanathan, D. G. Schlom, H. M. Christen, H. Y. Zhai, and A. Goyal, **Supercond. Sci. & Technology**, 17 (2004) S196-201.
131. "Characterization of Suitable Buffer Layers on Cu and Cu-alloy Metal Substrates for the Development of Coated Conductors," Cantoni C, Christen DK, Specht ED, Varela M, Thompson JR, Goyal A, Thieme C, Xu Y, Pennycook SJ, **Supercond. Sci. & Technology**, 17 (2004) S341-344.
132. "Ni overlayers on biaxially textured Ni-alloy and Cu substrates by DC sputtering," Rutter NA, Goyal A, Vallet CE, List FA, Lee DF, Heatherly L, Kroeger DM, **Supercond. Sci. & Technology**, 17 (2004) 527-531.
133. "Detection of Interfacial Strain and Phase Separation in $MBa_2Cu_3O_{7-x}$ Thin Films Using Raman Spectroscopy and X-ray Diffraction Space Mapping," Kartik Venkataraman, A. Jeremy Kropf, Carlo U. Segre, Quanxi Jia, A. Goyal, S. Chattopadhyay, Victor A. Maroni, **Physica C**, 402 (2004) 1-16.
134. "Oxidation of Carbon on Nickel-Based Metallic Substrates: Implications of Coated Conductors," F. A. List, L. Heatherly, D. F. Lee, K. Leonard and A. Goyal, **J. of Mater. Res.**, 17 (2004) 765-773.
135. "Preparation of YBCO Films on CeO_2 -Buffered (001) YSZ Substrates by a Non-Fluorine MOD Method," Yongli Xu, A. Goyal, N.A. Rutter, Donglu Shi and S.

Sathyamurthy, **J. of Am. Cer. Soc.**, 87 (2004) 1669-1676.

136. "Metal-Oxide Interfaces in Second Generation HTS Wires: Mechanism of Epitaxial Growth of Oxide Films Mediated by a Sulfur Superstructure," C. Cantoni, D. K. Christen, A. Goyal, L. Heatherly, F. A. List, E. D. Specht, M. A. Varela and S. J. Pennycook, published in book titled "**Functional Growth of Epitaxial Oxides**" edited by A. Goyal and W. Wong-Ng, to be published by Kluwer Academic Publishers, NY, 2004.
137. "Modeling Current Percolation in Granular Superconductors," N. Rutter and A. Goyal, published in the proceedings of the symposium titled "**Functional Growth of Epitaxial Oxides**" edited by A. Goyal and W. Wong-Ng published by Kluwer Academic Publishers, NY, 2004.
138. "Deposition of $(211_{-0.5nm}/123_{-15nm})_xN$ Multilayer Coated Conductors on Ni-based Textured Substrates," T. Haugan, P. Barnes, R. Nekkanti, J. M. Evans, L. Brunke, I. Maartense, J. P. Murphy, A. Goyal, A. Gapud, L. Heatherly, published in the proceedings of the symposium titled "**Functional Growth of Epitaxial Oxides**" edited by A. Goyal and W. Wong-Ng published by Kluwer Academic Publishers, NY, 2004.
139. "Reel-to-reel ex situ conversion of high critical current density electron beam co-evaporated BaF_2 precursor on RABiTS," D. F. Lee, K. J. Leonard, L. Heatherly, F. A. List, S. W. Cook, J. Yoo, M. Paranthaman, P. M. Martin, A. Goyal and D. M. Kroeger, **Supercond. Sci. Technol.**, 17 (3): 386-394 MAR 2004.
140. "Pulsed Electron Deposition for Coated Conductors," Hong-Ying Zhai, Hans M. Christen, Ron Feenstra, Frederick A. List III, Amit Goyal, Keith J. Leonard, Yongli Xu, David K. Christen, Kartik Venkataraman, and Victor A. Maroni, **Mat. Res. Soc. Symp. Proc.** Vol. EXS-3, EE 1.8.1-1.8.3, published by Materials Research Society, 2004.
141. "Growth of Epitaxial Y_2O_3 Film on Biaxially Textured NiW Substrates," M.S. Bhuiyan, M. Paranthaman, S. Sathyamurthy, T. Aytug, S. Kang, D. F. Lee, A. Goyal, E.A. Payzant and K. Salama, **Mat. Res. Soc. Symp. Proc.** Vol. EXS-3, EE 4.5.1-4.5.3, published by Materials Research Society, 2004.
142. "Critical Current Modeling for Coated Conductor Applications," N. Rutter and A. Goyal, **Mat. Res. Soc. Symp. Proc.** Vol. EXS-3, EE 5.24.1-5.24.3, published by Materials Research Society, 2004.
143. "Reel-to-reel Continuous Chemical Solution Deposition of Epitaxial Gd_2O_3 Buffer Layers on Biaxially Textured Metal Tapes for the Fabrication of YBCO Coated Conductors," T. Aytug, M. Paranthaman, B. Kang, D. Beach, S. Sathyamurthy, E. Specht, R. Feenstra, A. Goyal, D. Kroeger, K. Leonard, P. Martin and D. Christen, chapter in book titled "**Progress in High-Temperature Superconductors**", published by the American Ceramic Society, Westerville, OH, April, 2004, pgs 65-54.
144. "Control of the sulfur $c(2 \times 2)$ Superstructure on $\{100\}<100>$ Textured Metal Templates for RABiTS Applications," C. Cantoni, D. Christen, L. Heatherly, F. List, A. Goyal, G. Ownby and D. Zehner, chapter in book titled "**Progress in High-Temperature Superconductors**", published by the American Ceramic Society, Westerville, OH, April, 2004, pgs. 85-100.
145. "An Economical Route for Production of High-Quality YSZ Buffer Layers using the ECONO process," M. A. Zurbuchen, S. Sambasivan, S. Barnett, B. Kang, A. Goyal, P. Barnes and C. E. Oberly, chapter in book titled "**Progress in High-Temperature Superconductors**", published by the American Ceramic Society, Westerville, OH, April, 2004, pgs. 133-146.
146. "YBCO Films Through a Fluorine Free TMAP MOD Approach," Y. Xu, D. Shi, A. Goyal, M. Paranthaman, N. A. Rutter, P. Martin and D. Kroeger, chapter in book titled "**Progress in High-Temperature Superconductors**", published by the

American Ceramic Society, Westerville, OH, April, 2004, pgs. 175-182.

147. "Effect of Transverse Compressive Stress on Transport Critical Current Density of YBCO Coated Ni and NiW RABiTS Tapes," N. Cheggour, J. Ekin, C. Clickner, R. Feenstra, A. Goyal, M. Paranthaman and N. Rutter, chapter in book titled "**Progress in High-Temperature Superconductors**", published by the American Ceramic Society, Westerville, OH, April, 2004, pgs. 183-196.
148. "Demonstration of High Current Density Films on all Solution Buffers," M. Paranthaman, S. Sathyamurthy, H. Zhai, H. Christen, S. Kang and A. Goyal, chapter in book titled "**Progress in High-Temperature Superconductors**", published by the American Ceramic Society, Westerville, OH, April, 2004, pgs. 255-260.
149. "Solution Buffer Layers for YBCO Coated Conductors," S. Sathyamurthy, M. Paranthaman, H. Zhai, S. Kang, C. Cantoni, S. Cook, L. Heatherly and A. Goyal, chapter in book titled "**Progress in High-Temperature Superconductors**", published by the American Ceramic Society, Westerville, OH, April, 2004, pgs. 261-266.
150. "Development of Conductive La_{0.7}Sr_{0.3}MnO₃ Buffer Layers for Cu-Based RABiTS," T. Aytug, M. Parathaman, A. Goyal, A. Gapud, N. Rutter, H. Zhai and D. Christen, chapter in book titled "**Progress in High-Temperature Superconductors**", published by the American Ceramic Society, Westerville, OH, April, 2004, pgs. 281-284.
151. "Analytical Transmission Electron Microscopy of Thick YBCO Films on RABiTS," K. J. Leonard, S. Kang, B. Kang, A. Goyal, and D. Kroeger, chapter in book titled "**Progress in High-Temperature Superconductors**", published by the American Ceramic Society, Westerville, OH, April, 2004, pgs. 285-294.
152. "Reversible Axial-Strain Effect and Extended Strain Limits in Y-Ba-Cu-O Coatings on Deformation-Textured Substrates," N. Cheggour, J. W. Ekin, C. C. Clickner, D. T. Verebelyi, C. L. H. Thieme, R. Feenstra and A. Goyal, **Appl. Phys. Lett.**, 83 (2003) 4223-4225. (Nov. Issue)
153. "Uniform performance of continuously processed YBCO coated conductors," D. T. Verebelyi, U. Schoop, C. Thieme, X. Li, W. Zhang, T. Kodenkandath, A. P. Malozemoff, N. Nguyen, E. Siegal, D. Buczek, J. Lynch, J. Scudiere, M. Rupich, A. Goyal, E. D. Specht, P. Martin and M. Paranthaman, **Supercond. Sci. Technol.**, 16 (2003) L19-L22.
154. "Deposition and Characterization of YBa₂Cu₃O_{7-delta}/LaMnO₃/MgO/TiN Hetero-Structures on Cu Metal Substrates for Development of Coated Conductors," Cantoni, C., Christen, D.K., Varela, M., Thompson, J.R., Pennycook, S.J., Specht, E.D., Goyal, A. **J. Mater. Res.**, 18 (2003) 2387-2400. (Oct. issue)
155. "MOD approach for the growth of epitaxial CeO₂ buffer layers on biaxially textured Ni-W substrates for YBCO coated conductors," Bhuiyan MS, Paranthaman M, Sathyamurthy S, Aytug T, Kang S, Lee DF, Goyal A, Payzant EA, Salama K, **Supercond. Sci. & Technology**, 16 (2003) 1305-1309. (Nov. Issue)
156. "New approach to depositing yttria-stabilized zirconia buffer layers for coated conductors," Sambasivan S, Kim I, Barnett S, Zurbuchen MA, Ji J, Kang BW, Goyal A, Barnes PN, Oberly CE, **J. of Mat. Res.**, 18 (4): 919-928, 2003.
157. "Electrical and Magnetic Properties of Conductive Cu-based RABiTS," T. Aytug, M. Paranthaman, J. R. Thompson, A. Goyal, N. Rutter, H. Y. Zhai, A. A. Gapud, A. O. Ijadoula and D. K. Christen, **Appl. Phys. Lett.**, 83 (2003) 3963-3965. (Nov. Issue)
158. "Fabrication of high-critical current density YBa₂Cu₃O_{7-x} films using a fluorine-free sol gel approach," Xu Y, Goyal A, Rutter NA, Shi D, Paranthaman M, Sathyamurthy S, Martin PM, Kroeger DM, **J. of Mat. Res.**, 18 (3): 677-681, 2003.
159. "High critical current density YBa₂Cu₃O_{7-x} coatings on LaMnO₃-buffered biaxially textured Cu tapes for coated conductor applications," Aytug T, Goyal A, Rutter N,

Paranthaman M, Thompson JR, Zhai HY, Christen DK, **J. of Mat. Res.**, 18 (4): 872-877, 2003.

160. "Reel-to-reel continuous chemical solution deposition of epitaxial Gd_2O_3 buffer layers on biaxially textured metal tapes for the fabrication of $YBa_2Cu_3O_{7-x}$ coated conductors," Aytug T, Paranthaman MP, Kang BWW, Beach DB, Sathyamurthy S, Specht ED, Lee DF, Feenstra R, Goyal A, Kroeger DM, Leonard KJ, Martin PM, Christen DK, **J. of the Am. Cer. Soc.**, 86 (2): 257-265, 2003.
161. "Effect of Transverse Compressive Stress on Transport Critical Current Density of YBCO Coatings on Biaxially Textured Ni and Ni-W-Fe Substrates," N. Cheggour, J. Ekin, C. Clickner, R. Feenstra, A. Goyal, M. Paranthaman and N. Rutter, in book "Processing of High Temperature Superconductors," **Ceramic Transactions**, Vol. 140, edited by A. Goyal, W. Wong-Ng, M. Murakami and J. Driscoll, 2003, publisher: American Ceramic Society, pgs. 157-170.
162. "YBCO Films Through a Fluorine Free TMAP MOD Approach," Y. Xu, D. Shi, A. Goyal, M. Paranthaman, N. Rutter, P. Martin and D. Kroeger, in book "Processing of High Temperature Superconductors," **Ceramic Transactions**, Vol. 140, edited by A. Goyal, W. Wong-Ng, M. Murakami and J. Driscoll, 2003, publisher: American Ceramic Society, pgs. 129-136.
163. "An Economical Route for Production of High-Quality YSZ Buffer Layers Using the ECONOTM Process," M. Zurbuchen, S. Sambasivan, B. Kang, A. Goyal, S. Barnett, P. A. Barnes, and C. Oberly, in book "Processing of High Temperature Superconductors," **Ceramic Transactions** Vol. 140, edited by A. Goyal, W. Wong-Ng, M. Murakami and J. Driscoll, 2003, publisher: American Ceramic Society, pgs. 77-90.
164. "Control of the Sulfur c (2 x2) Superstructure on {100}<100> Textured Metals for RABiTS Applications," C. Cantoni, D. Christen, L. Heatherly, F. List, G. Ownby and D. Zehner, in book "Processing of High Temperature Superconductors," **Ceramic Transactions** Vol. 140, edited by A. Goyal, W. Wong-Ng, M. Murakami and J. Driscoll, 2003, publisher: American Ceramic Society, pgs. 17-32.
165. "Development of conductive buffer layers for Cu-based RABiTS coated conductors," T. Aytug, M. Paranthaman, J. R. Thompson, A. Goyal, N. Rutter, H. Y. Zhai, A. A. Gapud, A. O. Ijaduola and D. K. Christen, **Appl. Phys. Lett.**, 83 (19): 3963-3965 NOV 10 2003.
166. "Microstructural Characterization of Thick $YBa_2Cu_3O_{7-x}$ Films on Improved Rolling-Assisted-Biaxially-Textured Substrates," K. J. Leonard, S. Kang, A. Goyal, K. Yarborough and D. M. Kroeger, **J. of Mater. Res.**, 18(5), 1109-1122, 2003.
167. "Microstructure Characterization of the Thickness Dependence of Critical Current Density of $YBa_2Cu_3O_{7-x}$ on Rolling-Assisted Biaxially Textured Substrates," K. J. Leonard, B. W. Kang, A. Goyal, D. M. Kroeger, S. Kang, J. W. Jones, M. Paranthaman, D. F. Lee, P. M. Martin and S. Sathyamurthy, **J. of Mater. Res.**, 18 (2003) 1109-1122.
168. "Development of Conductive $La_{0.7}Sr_{0.3}MnO_3$ Buffer Layers for Cu-Based RABiTS," T. Aytug, M. Paranthaman, A. Goyal, A. Gapud, N. Rutter, H. Y. Zhai and D. K. Christen, in book "Processing of High Temperature Superconductors," **Ceramic Transactions** Vol. 140, edited by A. Goyal, W. Wong-Ng, M. Murakami and J. Driscoll, 2003, publisher: American Ceramic Society, pgs. 119-128.
169. "Solution Processing of Lanthanum Zirconate Films as Single Buffer layers for High I_c YBCO Coated Conductors," S. Sathyamurthy, M. Paranthaman, H. Zhai, H. Christen, C. Cantoni, A. Goyal and P. Martin, **IEEE Trans. On Appl. Superconductivity**, 13(2): 2658-2660, Jun 2003.
170. "Growth of Oxide Seed Layers on Ni and Other technological Interesting Metal Substrates: Issues Related to Formation and Control of Sulfur Superstructures for Texture Optimization," C. Cantoni, D. Christen, A. Goyal, L. Heatherly, F. List, G. Ownby, D. Zehner, H. Christen and C. Rouleau, **IEEE Trans. On Appl.**

Superconductivity, 13(2): 2646-2650, Jun 2003.

171. "LaMnO₃: A Single Oxide Buffer Layer for High-Jc YBCO Coated Conductors," T. Aytug, M. Paranthaman, S. Kang, H. Zhai, H. Christen, C. Vallet, S. Sathyamurthy, A. Goyal and D. K. Christen, **IEEE Trans. On Appl. Superconductivity**, 13(2): 3530-3533, Jun 2003.
172. "Transverse Compressive Stress Effect in YBCO Coatings on Biaxially Textured Ni and Ni-5at%W Substrates," N. Cheggour, J. Ekin, C. Clickner, D. Verebelyi, C. Thieme, A. Malozemoff, R. Feenstra, A. Goyal and M. Paranthaman, **IEEE Trans. On Appl. Superconductivity**, 13(2): 2661-2664, Jun 2003.
173. "YBCO Coated Conductors by a MOD Process," Rupich, M.W.; Schoop, U.; Verebelyi, D.T.; Thieme, C.; Zhang, W.; Li, X.; Kodenkandath, T.; Nguyen, N.; Siegal, E.; Buczek, D.; Lynch, J.; Jowett, M.; Thompson, E.; Wang, J.-S.; Scudiere, J.; Malozemoff, A.P.; Li, Q.; Annavarapu, S.; Cui, S.; Fritzscheier, L.; Aldrich, B.; Craven, C.; Niu, F.; Schwall, R.; Goyal, A.; Paranthaman, M.; **IEEE Trans. On Appl. Superconductivity**, 13(2): 2458-2461, Jun 2003.
174. "Strengthened, biaxially textured Ni substrate with small alloying additions for coated conductor applications," A. Goyal, R. Feenstra, M. Paranthaman, J. R. Thompson, B. Y. Kang, C. Cantoni, D. F. Lee, F. A. List, P. M. Martin, E. Lara-Curzio, C. Stevens, D. M. Kroeger, M. Kowaleski, E. D. Specht, T. Aytug, S. Sathyamurthy, R. K. Williams and R. E. Ericson, **Physica C**, 382 (2002) 251-262.
175. "Comparative study of thickness dependence of critical current density of YBa₂Cu₃O_{7-x} on (100) SrTiO₃ and on rolling-assisted biaxially textured substrates," Kang BW, Goyal A, Lee DR, Mathis JE, Specht ED, Martin PM, Kroeger DM, Paranthaman M, Sathyamurthy S, **J. of Mat. Res.**, 17 (7): 1750-1757, 2002.
176. "Ni-Cr textured substrates with reduced ferromagnetism for coated conductor applications," Thompson JR, Goyal A, Christen DK, Kroeger DM, **Physica C**, 370 (3): 169-176, 2002.
177. "Uniform texture in meter-long YBa₂Cu₃O₇ tape," **Physica C: Superconductivity**, Volume 382, Issues 2-3, 1 November 2002, Pages 342-348, E. D. Specht, F. A. List, D. F. Lee, K. L. More, A. Goyal, W. B. Robbins and D. O'Neill.
178. "Chemical solution deposition of lanthanum zirconate buffer layers on biaxially textured Ni-1.7% Fe-3% W alloy substrates for coated-conductor fabrication," Sathyamurthy S, Paranthaman M, Aytug T, Kang BW, Martin PM, Goyal A, Kroeger DM, Christen DK, **J. of Mat. Res.**, 17 (6): 1543-1549 JUN 2002.
179. "Epitaxial titanium diboride films grown by pulsed-laser deposition," Zhai HY, Christen HM, Cantoni C, Goyal A, Lowndes DH, **Appl. Phys. Lett.**, 80 (11): 1963-1965, 2002.
180. "Bulk solution techniques to fabricate high J_c YBa₂Cu₃O_{7-x} coated conductors," Paranthaman MP, Aytug T, Sathyamurthy S, Beach DB, Goyal A, Lee DF, Kang BW, Heatherly L, Specht ED, Leonard KJ, Christen DK, Kroeger DM, **Physica C**, 378: 1009-1012 Part 2, 2002.
181. Quantification and control of the sulfur c(2 x 2) superstructure on {100}(100) Ni for optimization of YSZ, CeO₂, and SrTiO₃ seed layer texture, Cantoni C, Christen DK, Heatherly L, Kowaleski MM, List FA, Goyal A, Ownby GW, Zehner DM, Kang BW, Kroeger DM, **J. of Mat. Res.**, 17 (10): 2549-2554 OCT 2002.
182. "Lanthanum zirconate: A single buffer layer processed by solution deposition for coated conductor fabrication," S. Sathyamurthy, M. Paranthaman, H-Y. Zhai, H.M. Christen, P.M. Martin, A. Goyal, **J. of Mater. Res.**, vol. 17, pg. 2181-2184, 2002.
183. "Growth of YBCO thin films on TiN(001) and CeO₂-coated TiN surfaces," I. Kim, P. Barnes, A. Goyal, S. Barnett, R. Biggers, G. Kozlowski, C. Varanasi, I. Maartens, R. Nekkanti, T. Peterson, T. Haugan and S. Sambasivan, **Physica C**, 377 (2002) 227-234.
184. "Microstructure of pulsed laser deposited YBa₂Cu₃O_{7-x} films on yttria-stabilized

zirconia/CeO₂ buffered biaxially textured Ni substrates,” Yang CY, Babcock SE, Ichinose A, Goyal A, Kroeger DM, Lee DF, List FA, Norton DP, Mathis JE, Paranthaman M, Park C, **Physica C**, 377 (3): 333-347 SEP 1 2002

185. “High-J_c YBCO Coatings on Reel-to-Reel Dip-Coated Gd₂O₃ Seed Buffer layers Epitaxially Fabricated on Biaxially Textured Ni and Ni-(3at%W-1.7at%Fe) Alloy Tapes,” T. Aytug, M. Paranthaman, S. Sathyamurthy, B. Kang, D. Beach, C. Vallet, E. Specht, D. Lee, R. Feenstra, A. Goyal, D. Kroeger, K. Leonard, P. Martin and D. Christen, **Material Research Society, Symposium Proceedings**, Volume No. 689, pg. 211-216, edited by M. Paranthaman, M. Rupich, K. Salama, J. Mannhart and T. Hasegawa, 2002.
186. “Progress Towards a Low-Cost Commercial Coated Conductor,” S. Annavarapu, N. Nguyen, S. Cui, U. Schoop, C. Thieme, M. Rupich, T. Kodenkandath, D. Verebelyi, W. Zhang, X. Li, Q. Li, M. Paranthaman, A. Goyal, C. Cantoni, M. Kowaleski and F. List, **Material Research Society, Symposium Proceedings**, Volume No. 689, pg. 231-237, edited by M. Paranthaman, M. Rupich, K. Salama, J. Mannhart and T. Hasegawa, 2002.
187. “Effect of Sulfur Surface Structure on Nucleation of Oxide Seed Layers on Textured Metals for Coated Conductor Applications,” C. Cantoni, D. Christen, A. Goyal, L. Heatherly, G. Ownby, D. Zehner, D. Norton, C. Rouleau and H. Christen, **Material Research Society, Symposium Proceedings**, Volume No. 689, pg. 349-354, edited by M. Paranthaman, M. Rupich, K. Salama, J. Mannhart and T. Hasegawa, 2002.
188. “Fabrication of High-J_c YBCO Coated Conductors Using Sol-Gel Buffer layers on Ni and Ni Alloy Substrates,” S. Sathyamurthy, M. Paranthaman, B. Kang, H. Christen, E. Specht, M. Kowaleski, A. Goyal and P. Martin, **Material Research Society, Symposium Proceedings**, Volume No. 689, pg. 357-362, edited by M. Paranthaman, M. Rupich, K. Salama, J. Mannhart and T. Hasegawa, 2002.
189. “Microstructural Characterization of YBCO Films Grown by a Fluorine-free MOD Process,” Y. Xu, J. Lian, A. Goyal, D. Shi, M. Paranthaman, N. Rutter, L. Wang, P. Martin and D. Kroeger, **Physica C**, 2002.
190. “(La,Sr)TiO₃ as a candidate buffer for RABiTS coated conductors,” D. P. Norton, K. Kim, D. K. Christen, J. D. Budai, B. C. Sales, M. F. Chisholm, D. M. Kroeger, A. Goyal, and C. Cantoni, **Physica C**, 372-376 (2002) 818-820.
191. “Recent progress in the fabrication of high-J(c) tapes by epitaxial deposition of YBCO on RABiTS,” Goyal A, Lee DF, List FA, Specht ED, Feenstra R, Paranthaman M, Cui X, Lu SW, Martin PM, Kroeger DM, Christen DK, Kang BW, Norton DP, Park C, Verebelyi DT, Thompson JR, Williams RK, Aytug T, Cantoni C, **Physica C**, 357: 903-913, 2001.
192. “Reflection high-energy electron diffraction studies of epitaxial oxide seed-layer growth on rolling-assisted biaxially textured substrate Ni(001): The role of surface structure and chemistry,” Cantoni C, Christen DK, Feenstra R, Goyal A, Ownby GW, Zehner DM, Norton DP, **Appl. Phys. Lett.**, 79 (19): 3077-3079, 2001.
193. “Inter- and intragrain transport measurements in YBa₂Cu₃O_{7- δ} deformation textured coated conductors,” Feldman DM, Larbalestier DC, Verebelyi DT, Zhang W, Li Q, Riley GN, Feenstra R, Goyal A, Lee DF, Paranthaman M, Kroeger DM, Christen DK, **Appl. Phys. Lett.**, 79 (24): 3998-4000 DEC 10 2001.
194. “Effect of calcium doping in low angle grain boundaries of YBCO on RABiTS,” B. W. Kang, A. Goyal, F. A. List, D. K. Christen, H. Kerchner, S. Sathyamurthy, D. F. Lee, P. M. Martin and D. M. Kroeger, **Proc. 2001 Int. Workshop on Superconductivity**, pg. 170-172, June 24-47, Honolulu, Hawaii, 2001.
195. “Progress towards a low-cost commercial coated conductor,” S. Annavarapu, N. Nyuyen, S. Cui, U. Schoop, C. Thieme, M. Rupich, T. Kodenkandath, D. Verebelyi, W. Zhang, X. Li, Q. Li, M. Paranthaman, A. Goyal, C. Cantoni, M. Kowaleski and F. A. List, published in the **Proc. Of the MRS’2001 Fall Meeting**.
196. “Effects of surface chemistry and structure on buffer layer epitaxy,” C. Cantoni, D.

- K. Christen, D. P. Norton, R. Feenstra, A. Goyal, G. W. Ownby and D. M. Zehner, **Proc. 2001 Int. Workshop on Superconductivity**, pg. 29-31, June 24-47, Honolulu, Hawaii, 2001.
197. "Progress in TFA solution processed YBCO coated conductors," C. Thieme, E. Thompson, S. Annavarapu, Q. Li, W. Zhang, M. W. Rupich, M. Paranthaman, A. Goyal, D. F. Lee, E. D. Specht and F. A. List, **Proc. 2001 Int. Workshop on Superconductivity**, pg. 233-235, June 24-47, Honolulu, Hawaii, 2001.
198. "Inter and Intra grain transport measurements in YBCO deformation textured coated conductors," D. M. Feldman, D. C. Larbalestier, D. T. Verebelyi, W. Zhang, Q. Li, G. N. Riley, R. Feenstra, A. Goyal, D. F. Lee, M. Paranthaman, D. M. Kroeger and D. K. Christen, **Proc. 2001 Int. Workshop on Superconductivity**, pg. 257-259, June 24-47, Honolulu, Hawaii, 2001.
199. "La_{0.7}Sr_{0.3}MnO₃: a single, conductive-oxide buffer layer for the development of YBaCuO coated conductors," T. Aytug, M. Parathaman, B. W. Kang, S. Sathyamurthy, A. Goyal and D. K. Christen, **Appl. Phys. Lett.**, 79, 2205, (2001).
200. "Fabrication of long lengths of epitaxial buffer layers on biaxially textured-Ni substrates using a continuous reel-to-reel dip-coating unit," M. Paranthaman, T.G. Chirayil, F.A. List, X. Cui, A. Goyal, D.F. Lee, E.D. Specht, P.M. Martin, R.K. Williams, D.M. Kroeger, J.S. Morrell, D.B. Beach, R. Feenstra, and D.K. Christen, "**J. Amer. Ceram. Soc.** 84, 273-278 (2001).
201. "Continuous Deposition of Ex-Situ YBCO Precursor Films on Rolling-Assisted Biaxially Textured Substrates by Electron Beam Evaporation," X. Cui, F.A. List, D.M. Kroeger, D.F. Lee, M. Paranthaman, A. Goyal, B.W. Kang, E.D. Specht, and P.M. Martin, **Physica C** 351, 175-181 (2001).
202. "Low Cost Y-Ba-Cu-O Coated Conductors," M.W. Rupich, Q. Li, S. Annavarapu, C. Thieme, W. Zhang, V. Prunier, M. Paranthaman, A. Goyal, D.F. Lee, E.D. Specht, and F.A. List, **IEEE Trans. on Applied Superconductivity**, 11, 2927-2930 (2001).
203. "Magneto-Optical Imaging of Transport Currents in YBa₂Cu₃O_{7-x} on RABiTS™," D. Matthew Feldman, Jodi L Reeves, Anatolii A. Polyanskii, Amit Goyal, Ron Feenstra, D.F. Lee, M. Paranthaman, D.M. Kroeger, D.K. Christen, Sue E. Babcock, David C. Larbalestier, **IEEE Trans. on Applied Superconductivity**, 11, 3772-3775 (2001).
204. "Progress in solution-based YBCO coated conductors," Q. Li, W. Zhang, U. Schoop, M.W. Rupich, S. Annavarapu, D.T. Verebelyi, C.L.H. Thieme, V. Prunier, X. Cui, M.D. Teplitsky, L.G. Fritzemeier, G.N. Riley, M. Paranthaman, A. Goyal, D.F. Lee, and T.G. Holesinger, **Physica C** 357, 987-990 (2001).
205. "Electron beam co-evaporation of Y-BaF₂-Cu precursor films for YBa₂Cu₃O_{7-y} coated conductors," S.W. Lu, F.A. List, X. Cui, M. Paranthaman, B.W. Kang, D.M. Kroeger, A. Goyal, P.M. Martin, and R.E. Ericson, **Supercond. Sci. Tech.** 14, 218-223 (2001).
206. "Fabrication of Long Lengths of YBCO Coated Conductors using a Continuous Reel-to-Reel Dip-Coating Unit," M. Paranthaman, T.G. Chirayil, S. Sathyamurthy, D.B. Beach, A. Goyal, F.A. List, D.F. Lee, X. Cui, S.W. Lu, B. Kang, E.D. Specht, P.M. Martin, D.M. Kroeger, R. Feenstra, C. Cantoni, and D.K. Christen, **IEEE Trans. on Applied Superconductivity** 11, 3146-3149 (2001).
207. "High current density coated YBCO coated conductors on strengthened, biaxially textured Ni-W substrates," M. Paranthaman, S. Sathyamurthy, T. Aytug, D. Beach, A. Goyal, B. W. Kang, R. Feenstra, D. K. Christen, D. F. Lee, P. M. Martin, L. Heatherly and D. M. Kroeger, **Proc. 2001 Int. Workshop on Superconductivity**, pg. 87-90, June 24-47, Honolulu, Hawaii, 2001.
208. "Bilayer conductive oxide buffer layer structures for high-J_c YBCO coated conductors," T. Aytug, B. W. Kang, D. T. Verebelyi, C. Cantoni, S. Sathyamurthy,

- A. Goyal, P. M. Martin, M. Paranthaman and D. K. Christen, Proc. **2001 Int. Workshop on Superconductivity** pg. 90-92, June 24-47, Honolulu, Hawaii, 2001.
209. "Solution deposition approaches to coated conductor fabrication on biaxially textured Ni-W substrates," S. Sathyamurthy, B. W. Kang, M. Paranthaman, T. Aytug, R. Feenstra, A. Goyal and D. M. Kroeger, **2001 Int. Workshop on Superconductivity** pg. 119-121, June 24-47, Honolulu, Hawaii, 2001.
210. "Grain Boundaries in High-Tc Superconductors – Data, Ideas and Prospects," J. Mannhart, G. Hammerl, H. Bielefeldt, H. Hilgenkamp, S. Leitenmeier, A. Schmehl, C. W. Schneider, R. R. Schultz, A. Goyal, B. W. Kang, F. A. List, D. K. Christen and D. M. Kroeger, Published in the **Proc. Of the 2001 IWCC Conference**, Göttingen, Germany, May, 2001.
211. Growth and characterization of conductive SrRuO₃ and LaNiO₃ multilayers on textured Ni tapes for high-J(c) YBa₂Cu₃O_{7-d} coated conductors, Aytug T, Kang BW, Cantoni C, Specht ED, Paranthaman M, Goyal A, Christen DK, Verebelyi DT, Wu JZ, Ericson RE, Thomas CL, Yang CY, Babcock SE, **J. of Mater. Res.** 16 (9): 2661-2669 SEP 2001.
212. Recent progress in the fabrication of high-J(c) tapes by epitaxial deposition of YBCO on RABiTS, Goyal A, Lee DF, List FA, Specht ED, Feenstra R, Paranthaman M, Cui X, Lu SW, Martin PM, Kroeger DM, Christen DK, Kang BW, Norton DP, Park C, Verebelyi DT, Thompson JR, Williams RK, Aytug T, Cantoni C, Proc. of the ISS'2000, **Advances in Superconductivity XIII**, Part II, pg. 903-913, 2001.
213. "Fabrication of Long Lengths of Epitaxial Buffer Layers on Biaxially Textured-Ni Substrates Using a Continuous Reel-to-Reel Dip-Coating Unit," Paranthaman, M., T. G. Chirayil, F. A. List, X. Cui, A. Goyal, D. F. Lee, E. D. Specht, P. M. Martin, R. K. Williams, D. M. Kroeger, J. S. Morrell, C. B. Beach, R. Feenstra, and D. K. Christen, **Journal of American Ceramic Society**, 84(2): 273-278, Feb. 2001.
214. "Grain Boundary Character Based Design of Polycrystalline High Temperature Superconducting Wires," A. Goyal, in the book titled "**Electron Backscatter Diffraction in Materials Science**" edited by A. J. Schwartz, M. Kumar and B. L. Adams, **Kluwer Academic / Plenum Publishers**, pgs. 319-333, 2000.
215. "Factors Affecting the Critical Current Density of Epitaxial HTS on RABiTS," A. Goyal, E. D. Specht, R. Feenstra, D. F. Lee, F. A. List, M. Paranthaman, D. Kroeger and D. K. Christen, published in the **Proc. of the IWCC'2000**, Fukuoka, Japan, Oct. 2000.
216. B.L. Adams, B. Henrie, and A. Goyal, "Microstructure-Sensitive Compliant Mechanism Design," in **Plastic and Viscoplastic Response of Materials and Metal Forming**, eds. A. S. Khan, H. Zhang, and Y. Yuan, NEAT Press, Fulton, MD (2000) p. 513-515.
217. "Microstructural homogeneity and electromechanical connectivity of YBa₂Cu₃O_{7-x} grown on rolling-assisted biaxially textured coated conductor substrates," C.-Y. Yang, A. Pashitski, A. Polyanskii, D.C. Larbalestier, S.E. Babcock, A. Goyal, F.A. List, C. Park, M. Paranthaman, D.P. Norton, D.F. Lee, and D.M. Kroeger, **Physica C** 329, 114-120 (2000).
218. "Demonstration of High Current Density YBCO Coated Conductors on RE₂O₃-Buffered Ni Substrates with Two New Alternative Architectures," M. Paranthaman, R. Feenstra, D.F. Lee, D.B. Beach, J.S. Morrell, T.G. Chirayil, A. Goyal, X. Cui, D.T. Verebelyi, J.E. Mathis, P.M. Martin, D.P. Norton, E.D. Specht, D.K. Christen, and D.M. Kroeger, **Advances in Cryogenic Engineering**, Kluwer Academic/Plenum Publishers, New York, Edited by U. Balu Balachandran, D.U. Gubser, K. Ted Hartwign and V.A. Bardos, Vol. 46, Part B, pp. 879-886 (2000).
219. "Epitaxial yttria-stabilized zirconia on biaxially-textured (001) Ni for YBCO coated conductor, Park C, Norton DP, Lee DF, Verebelyi DT, Goyal A, Christen DK, Budai JD, **Physica C**, 341: 2481-2482, Part 4 NOV 2000.

220. "Low angle grain boundary transport in $\text{YBa}_2\text{Cu}_3\text{O}_{7-x}$ coated conductors," D.T. Verebelyi, D.K. Christen, R. Feenstra, C. Cantoni, A. Goyal, D.F. Lee, M. Paranthaman, P.N. Arendt, R.F. DePaula, J.R. Groves, and C. Prouteau, **Appl. Phys. Lett.** 76, 1755-1757 (2000).
221. "Low-cost YBCO Coated Conductor Technology," A.P. Malozemoff, S. Annavarapu, L. Fritzemeier, Q. Li, V. Prunier, M. Rupich, C. Thieme, W. Zhang, A. Goyal, M. Paranthaman, and D.F. Lee, **Superconductor Sci. & Technol.** 13, 473-476 (2000).
222. "Epitaxial growth of $\text{La}_2\text{Zr}_2\text{O}_7$ thin films on rolled Ni-substrates by sol-gel process for high T_c superconducting tapes," T.G. Chirayil, M. Paranthaman, D.B. Beach, D.F. Lee, A. Goyal, R.K. Williams, X. Cui, D.M. Kroeger, R. Feenstra, D.T. Verebelyi, and D.K. Christen, **Physica C** 336, 63-69 (2000).
223. "YBCO Coated Conductors with High Engineering Current Density," M. Paranthaman, C. Park, X. Cui, A. Goyal, D.F. Lee, P.M. Martin, T.G. Chirayil, D.T. Verebelyi, D.P. Norton, D.K. Christen, and D.M. Kroeger, **J. Mater. Res.** 15, 2647-2652 (2000).
224. "Epitaxy of $\text{HgBa}_2\text{CaCu}_2\text{O}_6$ superconducting films on biaxially textured Ni substrates, Xie YY, Aytug T, Wu JZ, Verebelyi DT, Paranthaman M, Goyal A, Christen DK, **Appl. Phys. Lett.**, 77 (25): 4193-4195 DEC 18 2000.
225. "Progress Towards A Low-Cost Conductor Technology," S. Annavarapu, L. Fritzemeier, Q. Li, A. Malozemoff, V. Prunier, M.W. Rupich, C. Thieme, W. Zhang, M. Gopal, I. Seleznev, M.J. Cima, M. Paranthaman, A. Goyal, and D.F. Lee, **Physica C** 341-348, 2319-2322 (2000).
226. "An all-sputtered buffer layer architecture for high- J_c $\text{YBa}_2\text{Cu}_3\text{O}_{7-x}$ coated conductors," T. Aytug, J.Z. Wu, B.W. Kang, D.T. Verebelyi, C. Cantoni, E.D. Specht, A. Goyal, and M. Paranthaman, **Physica C** 340, 33-40 (2000).
227. B. L. Adams, B. Henrie, and A. Goyal, "Microstructure-Sensitive Compliant Mechanism Design," in **Plastic and Viscoplastic Response of Materials and Metal Forming**, eds. A. S. Khan, H. Zhang, and Y. Yuan, NEAT Press, Fulton, MD (2000) p. 513-515 (invited).
228. "Epitaxial Growth of Gadolinium Oxide on Roll-textured Nickel", J. S. Morrell, A. B. Xue, E. D. Specht, A. Goyal, P.M. Martin, D. F. Lee, R. Feenstra, D. T. Verebelyi, D. K. Christen, T. G. Chirayil, M. Paranthaman, C. E. Vallet and D. B. Beach, **J. Mater. Res.**, 15, 621, 2000.
229. "Scaling of Percolative Current Flow to Long Lengths in Biaxially Textured Conductors," E. D. Specht, A. Goyal and D. M. Kroeger, **Supercond. Sci. & Technology**, 13, 592, 2000.
230. "High Current Density $\text{HgBa}_2\text{CaCu}_2\text{O}_6$ Superconductivity Films on Textured Ni Substrates," Xie, Y. Y., T. Aytug, J. Z. Wu, D. T. Verebelyi, M. Paranthaman, A. Goyal, and D. K. Christen, **Appl. Phys. Lett.**, 77(25): 4193-4195, Dec. 2000.
231. "Nucleation of Epitaxial Ytria-Stabilized Zirconia on Biaxially Textured (001) Ni for Deposited Conductors," Park, C., D. P. Norton, D. T. Verebelyi, D. K. Christen, J. D. Budai, D. F. Lee, and A. Goyal, **App. Phys. Lett.** 76, 2427 (2000).
232. "Microstructural homogeneity and electromagnetic connectivity of $\text{YBa}_2\text{Cu}_3\text{O}_{7-x}$ grown on rolling-assisted biaxially textured coated conductor substrates," Yang C.Y., Pashitski A., Polyanskii A., Larbalestier D.C., Babcock S.E., Goyal A., List F.A., Park C., Paranthaman M., Norton D.P., Lee D.F., Kroeger D.M., **Physica C** 329, 114, 2000.
233. "Transport and structural characterization of epitaxial $\text{Nd}_{1-x}\text{Ba}_x\text{Cu}_3\text{O}_y$ thin films grown on LaAlO_3 and Ni metal substrates by pulsed-laser deposition," C. Cantoni, D.P. Norton, D.K. Christen, A. Goyal, D.M. Kroeger, D.T. Verebelyi, M. Paranthaman, **Physica C** 324, 177-186 (1999).
234. "Texture Formation and Grain Boundary Networks in Rolling Assisted Biaxially Textured Substrates (RABiTS) and in Epitaxial YBCO Films on such Substrates",

- A. Goyal, S. X. Ren, E. D. Specht, D. M. Kroeger, R. Feenstra, D. Norton, M. Paranthaman, D. F. Lee and D. K. Christen, **Micron**, 30, 463-478, 1999.
235. "Using RABiTS to Fabricate High-temperature Superconducting Wire", A. Goyal, R. Feenstra, F. A. List, T. Chirayil, D. T. Verebelyi, X. Cui, E. D. Specht, D. K. Christen, and P. M. Martin, **JOM, July 1999 – 21st Century Technologies**, 51 (1999) 19.
236. "Texture Development, Recrystallization, and Transference of Texture Between Ceramic Multilayers Epitaxially Grown on RABiTS," A. Goyal, R. Feenstra, E. D. Specht, D. M. Kroeger, D. F. Lee, M. Paranthaman, F. A. List and D. K. Christen, published in the **Proceedings of the ICOTOM12** Conference, 1999.
237. "Transport and Structural Characterization of $Nd_{1+x}Ba_{2-x}Cu_3O_y$ thin Films grown on $LaAlO_3$ and Ni Metal Substrates by Pulsed Laser Ablation", C. Cantoni, D. P. Norton, D. K. Christen, A. Goyal, D. M. Kroeger, D. T. Verebelyi and M. Paranthaman, **Physica C**, 324, 177, 1999.
238. "Epitaxial Growth of Yb_2O_3 Buffer Layers on Biaxially Textured-Ni (100) substrates by Sol-gel Process" T.G. Chirayil, M. Paranthaman, D.B. Beach, J.S. Morrell, E.Y. Sun, A. Goyal, R.K. Williams, D.F. Lee, P.M. Martin, D.M. Kroeger, R. Feenstra, D.T. Verebelyi, and D.K. Christen, **Mat. Res. Soc. Symp. Proc.** 574, 51-56 (1999).
239. "Response of superconducting characteristics of Hg-based high T_c thin films to photolithographic processes," C. Cantoni, D.P. Norton, D.K. Christen, A. Goyal, D.M. Kroeger, D.T. Verebelyi, and M. Paranthaman, **Physica C** 325, 56-60 (1999).
240. "Low-cost YBCO Coated Conductor Technology," A.P. Malozemoff, S. Annavarapu, L. Fritzemeier, Q. Li, V. Prunier, M. Rupich, C. Thieme, W. Zhang, A. Goyal, M. Paranthaman, and D.F. Lee, Published in the **EUCAS meeting Proc.**, Spain, September 1999.
241. "Effects of Grain Boundaries on Critical Currents of Coated Conductors", D. T. Verebelyi, R. Feenstra, A. Goyal and D. K. Christen, C. Prouteau, P. N. Arendt, R. F. DePaula and J. R. Grooves, **Proc. of the International Workshop on Critical Currents**, p. 51, Wisconsin, July, 1999.
242. "Alternating Transport-Current Flow in Superconducting Films – The Important Role of a Geometrical Barrier to Vortex Motion", H. R. Kerchner, D. P. Norton, A. Goyal, J. D. Budai, D. K. Christen, D. M. Kroeger, M. Paranthaman, D. F. Lee, F. A. List, R. Feenstra and E. H. Brandt, **Physical Review B**, 60, (1999) 6878.
243. "Growth of Biaxially Textured Re_2O_3 Buffer Layers on Rolled Ni Substrates Using Reactive Evaporation for HTS Coated Conductors", M. Paranthaman, D. F. Lee, A. Goyal, E. D. Specht, P. M. Martin, X. Cui, J. E. Mathis, R. Feenstra, D. K. Christen and D. M. Kroeger, **Supercond. Sci & Tech.**, 12, 319, 1999.
244. "Alternating Current Losses in Biaxially Textured YBCO Films Deposited on Ni Tapes," Kerchner HR, Norton DP, Goyal A, Budai JD, Christen DK, Kroeger DM, Specht ED, He Q, Paranthaman M, Lee DF, Sales BC, List FA, Feenstra R, **Appl. Phys. Lett.**, 71(4): 2029-2031, Oct. 1997.
245. "Alternative Buffer Architectures for High- J_c YBCO Superconducting Deposits on RABiTS", D. F. Lee, M. Paranthaman, J. E. Mathis, A. Goyal, D. M. Kroeger, E. D. Specht, R. K. Williams, F. A. List, P. M. Martin, C. Park, D. Norton and D. K. Christen, **Jap. J. of Appl. Phys.**, 38(2B), L178-180, 1998.
246. "Continuous Growth of Epitaxial CeO_2 Buffer Layers on Rolled Ni Tapes By Electron Beam Evaporation," X. Cui, F. A. List, D. M. Kroeger, A. Goyal, D. F. Lee, J. E. Mathis, E. D. Specht, P. M. Martin, R. Feenstra, D. T. Verebelyi, D. K. Christen and M. Paranthaman, **Physica C**, 316, 27, 1999.
247. "Demonstration of High Current Density YBCO Coated Conductors on Re_2O_3 -Buffered Ni Substrates With Two New Alternative Architectures," Paranthaman, M., R. Feenstra, D. F. Lee, D. B. Beach, J. S. Morrell, T. G. Chirayil, A. Goyal, X. Cui, D. T. Verebelyi, J. E. Mathis, P. M. Martin, D. P. Norton, E. D. Specht, D. K. Christen, and D. M. Kroeger, **Advances in Cryogenic Engineering**, ed. By Plenum Publishing Corporation, 1999.
248. "Optimization of Buffer Layers on Rolled-Ni Substrates for High Current YBCO

- and Tl, Bi-1223 Coated Conductors Using Ex-Situ Precursor Approaches,” Paranthaman, M., D. F. Lee, R. Feenstra, A. Goyal, D. T. Verebelyi, D. K. Christen, E. D. Specht, F. A. List, P. M. Martin, D. M. Kroeger, Z. F. Ren, W. Li, D. Z. Wang, J. Y. Lao, and J. H. Wang, p. 2268 in **IEEE Trans. Appl. Superconduct.**, 9(2), June 1999, Pages: 2268-2271.
249. “High Resolution TEM/AEM Characterization of Epitaxial Oxide Multilayers Fabricated by Laser Ablation on Biaxially Textured Ni, E. Y. Sun, A. Goyal et al., **Physica C**, 321, 29, 1999.
250. “Fabrication of high current YBCO coated conductors on RABiTS, M. Paranthaman, F. A. List, D. F. Lee, A. Goyal, R. Feenstra, D. P. Norton, C. Park, D. T. Verebelyi, D. K. Christen, P. M. Martin, E. D. Specht and D. M. Kroeger, To be published in the proceedings of the **9th CIMTEC Congress and Forum on New Materials**, Florence, Italy, June 14-19, 1999, p. 185, Ed. by P. Vincenzini, Techna Srl.
251. “Growth of textured buffer layers and superconductors on rolled-Ni substrates using sol-gel alkoxide precursors”, M. Paranthaman, S. S. Shoup, D. B. Beach, J. S. Morell, A. Goyal, E. D. Specht, J. E. Mathis, D. T. Verebelyi and D. K. Christen, To be published in the proceedings of the **9th CIMTEC Congress and Forum on New Materials**, Florence, Italy, June 14-19, 1999, p. 169, Ed. by P. Vincenzini, Techna Srl.
252. “In-plane Aligned Superconducting $Tl_{0.8}Bi_{0.22}Sr_{1.6}Ba_{0.4}Ca_2Cu_3O_9$ Films on RABiTS”, Z. F. Ren, W. Li, Z. Wang, J. Y. Lao, J. H. Wang, M. Paranthaman, D. Verebelyi, D. Christen, D. Lee, A. Goyal and D. M. Kroeger, **Physica C**, 313, 341, 1999.
253. “Superconducting Thallium Oxide Films from Electrodeposited Precursors”, R. N. Bhattacharya, P. A. Parilla, R. D. Blaugher, Z. F. Ren, W. Li, J. H. Wang, Y. T. Yang, A. M. Hermann, M. Paranthaman, A. Goyal, D. Verebelyi and D. Christen, Proc. of the 1998 Applied Superconductivity Conference, Palm Dessert, CA, **IEEE Transactions**, 9(2): 1681-1683, 1999.
254. “Optimization of Buffer Layers on Rolled-Ni Substrates for High Current YBCO and Tl,Bi-1223 Coated Conductors Using Ex-situ Precursor Approaches”, M. Paranthaman, D. Lee, R. Feenstra, A. Goyal, D. Verebelyi, D. Christen, E. Specht, F. List, P. martin and D. M. Kroeger, Proc. of the 1998 Applied Superconductivity Conference, Palm Dessert, CA, **IEEE Transactions**, 9(2): 2268-2271, 1999.
255. “Electromagnetic Connectivity and Microstructure in YBCO Films on RABiTS Substrates,” Babcock SE, Yang CY, Reeves JL, Wu Y, Pashitski AE, Polyanskii A, Larbalestier DC, Goyal A, Paranthaman M, List FA, Norton DP, Kroeger DM, Ichinose A, **Mat. Sci. For.**, 294-2: 165-168, 1999.
256. “Buffer Layers and Thallination of Tl-based Superconductors on Flexible Metal Substrates”, P. Parilla, C. Carlson, Y. Wang, R. Bhattacharya, R. Blaugher, D. Ginley, M. Paranthaman, A. Goyal, D. Christen, D. Kroeger, Proc. of the 1998 Applied Superconductivity Conference, Palm Dessert, CA, **IEEE Transactions**, 9(2): 1673-1676, 1999.
257. “Long Length Fabrication of YBCO on RABiTS Using Pulsed Laser Ablation”, C. Park, D. Norton, D. Christen, J. Budai, A. Goyal, D. Kroeger and M. Paranthaman, Proc. of the 1998 Applied Superconductivity Conference, Palm Dessert, CA, **IEEE Transactions**, 9(2): 2276- 2279, 1999.
258. “Low Cost Combustion Vapor Deposition of Epitaxial Buffer layers and Superconductors”, S. Shoup, D. Cousins, A. Hunt, S. Shanmughan, M. Paranthaman, A. Goyal, P. Martin and D. Kroeger, Proc. of the 1998 Applied Superconductivity Conference, Palm Dessert, CA, **IEEE Transactions**, 9(2): 2426- 2429, 1999.
259. “Bend Strain Tolerance of Critical Currents of Y-123 Films Deposited on roll-textured (001) Ni”, C. Park, D. P. Norton, J. Budai, D. Christen, D. Verebelyi, R. Feenstra, D. Lee, A. Goyal, D. Kroeger and M. Paranthaman, Proc. of the 1998 Applied Superconductivity Conference, Palm Dessert, CA, **IEEE Transactions**, 9(2): 2276- 2279, 1999.
260. “Reel-to-reel Continuous Deposition of Epitaxial CeO₂ Buffer Layers on Biaxially

- Textured Ni Tapes by Electron Beam Evaporation,” Cui, X.; List, F.A.; Kroeger, D.M.; Goyal, A.; Lee, D.F.; Mathis, J.; Specht, E.D.; Martin, P.M.; Feenstra, R.; Verebelyi, D.T.; Christen, D.K.; Paranthaman, M.; **IEEE Transactions**, 9(2): 1967-1970, 1999.
261. “Growth of Biaxially-Oriented Conductive LaNiO₃ Buffer-Layers on Textured Ni Tapes for High-T_c Coated Conductors”, Q. He, D. K. Christen, R. Feenstra, D. P. Norton, M. Paranthaman, E. D. Specht, A. Goyal and D. M. Kroeger, **Physica C**, 314, 105, 1998.
262. “Bend strain tolerance of critical currents for YBa₂Cu₃O_{7-x} films deposited on rolled-textured, (001)Ni,” Park C, Norton DP, Budai JD, Christen DK, Verebelyi D, Feenstra R, Lee DF, Goyal A, Kroeger DM, Paranthaman M., **Appl. Phys. Lett.**, 73, 1904, 1998.
263. “Microstructure of Electron-Beam Evaporated Epitaxial Ytria-Stabilized Zirconia / CeO₂ Bilayers on Biaxially Textured Ni Tape,” C. Yang, S. E. Babcock, A. Goyal. M. Paranthaman, F. A. List, D. P. Norton, D. M. Kroeger and A. Ichinose, **Physica C**, 307 (1-2): 87-88, Oct. 1998.
264. “High Critical Current Density YBa₂Cu₃O₇ Tapes Using the RABiTS Approach”, A. Goyal, F. A. List, J. Matthis, M. Paranthaman, E. D. Specht, C. Park, D. F. Lee, D. M. Kroeger, D. K. Christen, D. D. Budai and P. M. Martin, **J. of Superconductivity**, 11, 481, 1998.
265. “Epitaxial HTS on RABiTS: A Route Towards the Next Generation Superconducting Wire”, A. Goyal et al., **Proc. 1998 Int. Workshop on Superconductivity**, July 12-15, Okinawa, Japan, pg. 69, 1998.
266. “Biaxially Textured YBa₂Cu₃O_{7-δ} Conductors on RABiTS with Critical Current Densities of 2-3 MA/cm²”, J. E. Mathis, A Goyal et al., **Japan. J. of Appl. Phys.**, 37, 11B, 1998.
267. “High J_c YBa₂Cu₃O_{7-δ} Films on Buffer Layers made by Sputtering, F. A. List, A. Goyal et al., **Physica C**, 302, 87-92, 1998.
268. “Laser Ablated Epitaxial LaAlO₃ Buffer Layers on Biaxially Textured Ni Substrates for Superconducting Tapes”, C. M. Carlson, J. C. Price, P. A. Parilla, D. S. Ginley, R. D. Blaugher, A. Goyal, M. Paranthaman, D. M. Kroeger and D. K. Christen, **Physica C**, 304, 82-88, 1998.
269. “Development of Coated Conductors”, J. E. Hack, A. Goyal and D. Moon, To be published in the proceedings of the **8th US-Japan Workshop on Superconductivity**, Dec. 8-10, National High Field Magnet Laboratory, Tallahassee, Florida, 1998.
270. “High-J_c, Epitaxial HTS Conductors on Rolling-assisted-biaxially-textured-substrates (RABiTS)”, A. Goyal et al., published in the **Proceedings of the 8th US-Japan Workshop on HTS**, Dec. 8-10, National High Field Magnet Laboratory, Tallahassee, Florida, 1998.
271. “Microstructural Features of RABiTS Deposited by E-beam Evaporation”, S. E. Babcock, C. Yang, A. Polyanskii, D. C. Larbalestier, A. Goyal, M. Paranthaman and D. M. Kroeger, published in the **Proceedings of the 8th US-Japan Workshop on HTS**, Dec. 8-10, National High Field Magnet Laboratory, Tallahassee, Florida, 1998.
272. “Progress on Tl-based Wire and Tape”, P. A. Parilla, C. M. Carlson, R. D. Blaugher, A. Goyal, M. Paranthaman, D. M. Kroeger and D. K. Christen, published in the **Proceedings of the 8th US-Japan Workshop on HTS**, Dec. 8-10, National High Field Magnet Laboratory, Tallahassee, Florida, 1998.
273. “Cube-textured Ni Substrates for High-temperature Superconductors”, E. D. Specht, A. Goyal, D. F. Lee, D. M. Kroeger, M. Paranthaman, R. K. Williams and D. K. Christen, **Supercond. Sci. & Tech.**, 11, 945, 1998.
274. “Biaxially textured, epitaxial LaAlO₃ thick films on Ni using a sol-gel technique”, S. S. Shoup, M. Paranthaman, A. Goyal, E. D. Specht, D. F. Lee, D. M. Kroeger and D. B. Beach, **J. Am. Ceram. Soc.**, 81(11), 301-3021, 1998.
275. “Epitaxial YBCO films on rolled-textured metals for high temperature

- superconducting applications”, D. P. Norton, C. Park, C. Prouteau, D. K. Christen, A. Goyal, E. Y. Sun, D. F. Lee, D. M. Kroeger, E. Specht and M. Paranthaman, **J. of Mater. Sc. & Engg. B**, 56(2-3), 86-94, 1998.
276. “Epitaxial Film Growth of $Tl_{0.78}Bi_{0.22}Sr_{1.6}Ba_{0.4}Ca_2Cu_3O_{9-y}$ on Rolling Assisted Biaxially Textured Nickel Substrates with YSZ and CeO_2 Buffer Layers”, Z. F. Ren, J. Y. Lao, L. P. Guo, J. H. Wang, J. D. Budai, D. K. Christen, A. Goyal, M. Paranthaman, E. D. Specht and J. R. Thompson, **J. of Superconductivity**, vol. 1, pgs 159-161, 1998.
277. “Thick Film Processing for Tl-oxide Wire and Tape”, R. N. Bhattacharya, R. D. Blaugher, A. Natarajan, C. M. Carlson, P. A. Parilla, D. S. Ginley, M. Paranthaman, A. Goyal and D. M. Kroeger, **J. of Superconductivity**, vol. 11, pgs. 173-180, 1998.
278. “Exploring Spatial Resolution in Electron Back-scattered Diffraction (EBSD) Experiments via Monte Carlo Simulation”, S. X. Ren, E. A. Kenik, K. B. Alexander and A. Goyal, **Ultramicroscopy**, vol. 4, pgs 15-22, 1998.
279. “Epitaxial Superconductors on Rolling Assisted Biaxially Textured Superconductors (RABiTS): A Route Towards High Critical Current Density Wire”, A. Goyal et al., **Applied Superconductivity**, commemorating the 10th anniversary of HTS, vol. 4, pgs. 403-429, 1997.
280. “Conductors With Controlled Grain Boundaries: An Approach to the Next Generation, High Temperature Superconducting Wire,” A. Goyal, D. P. Norton et al., **Special 10th anniversary on High Temperature Superconductors of J. of Materials Research**, vol. 12, pgs. 2924-2940, 1997.
281. “Alternating current losses in biaxially textured $YBa_2Cu_3O_{7-\delta}$ films deposited on Ni tapes,” Kerchner HR, Norton DP, Goyal A, Budai JD, Christen DK, Kroeger DM, Specht ED, He Q, Paranthaman M, Lee DF, Sales BC, List FA, Feenstra R, **Appl. Phys. Lett.**, 71, 2029, 1997.
282. “Epitaxial $YBa_2Cu_3O_7$ on Biaxially Textured (001) Ni: An Approach to High Critical Current Density Superconducting Tapes”, D. P. Norton, A. Goyal et al., Proc. of the **ISTEC Workshop on HTS Materials**, 1997.
283. “Critical Current, Film Thickness, and Grain Alignment For Spray-pyrolyzed Films of Tl-1223”, E. D. Specht, A. Goyal, D. M. Kroeger, A. Mogro-Campero, P. J. Bednarczyk, J. E. Tkaczyk, and J. A. Deluca, **Physica C**, 270, pgs 91-96, 1997.
284. “Growth of Biaxially Textured Buffer Layers on Rolled-Ni Substrates by Electron Beam Evaporation”, M. Paranthaman, A. Goyal et al., **Physica C**, 275, 266, 1997.
285. “Low Cost, Single-crystal-like Substrates with Tailored Microstructures”, A. Goyal, D. P. Norton, M. Paranthaman, F. List, E. Specht, D. M. Kroeger and D. K. Christen, Proc. of the “**First Conference on Future Generation of Photovoltaic Technologies**”, Denver, Colorado, March 24-28, 1997.
286. “Fabrication of High Critical Current Density Superconducting Tapes by Epitaxial Deposition of YBCO Thick Films on Biaxially Textured Metal Substrates”, A. Goyal et al., published in the **Proc. of the 9th International Symposium on Superconductivity**, held Oct. 21-24, Sapporo, Hokkaido, Japan, 1996, pgs. 685-688, Springer-Verlag, Tokyo, 1997.
287. “Grain Boundary Networks and Percolative Current Flow in Polycrystalline, HTS Conductors”, A. Goyal, E. D. Specht and D. M. Kroeger, published in the **Proc. of the 9th International Symposium on Superconductivity**, held Oct. 21-24, Sapporo, Hokkaido, Japan, 1996, pgs. 815-818, Springer-Verlag, Tokyo, 1997.
288. “Grain Boundary Studies of High Temperature Superconducting Materials Using Electron Backscatter Kikuchi Diffraction”, A. Goyal, E. D. Specht, Z. L. Wang and D. M. Kroeger, **Ultramicroscopy**, 67, pgs. 35-57, 1997.
289. “Low-cost substrates for Photovolotaiacs”, D. P. Norton, A. Goyal et al., Proc. of the “**First Conference on Future Generation of Photovoltaic Technologies**”, Denver, Colorado, March 24-28, 1997.
290. “Epitaxial Oxides on Biaxially Textured Metals”, D. P. Norton, A. Goyal et al., published in the **Proceedings of the MRS Spring Meeting**, March 31 - April 3, 1997.

291. "Fabrication and Properties of High-J_c, Biaxially Aligned 123 Thick Films on metallic Tape Substrates", D. K. Christen, D. P. Norton, A. Goyal, J. D. Budai, R. Feenstra, Q. He, C. E. Klabunde, D. M. Kroeger, D. F. Lee, F. A. List, M. Paranthaman, B. Saffian, E. D. Specht and M. F. Chisholm, published in the Proceedings of the **International Workshop on Critical Currents in Superconductors for Practical Applications**, Xi'an, China, March 6-8, 1997.
292. "Growth of TlBa₂Ca₂Cu₃O_{9-y} Superconducting Films with Local Biaxial Alignment extending up to 5 mm on Ag Substrates using a Spray Pyrolysis Technique," M. Paranthaman, F. A. List, A. Goyal, E. D. Specht, C. E. Vallet, D. M. Kroeger, and D. K. Christen, **J. Mater. Res**, 12, p. 619, 1997.
293. "Development of Biaxially Textured Buffer Layers on Rolled-Ni Substrates for High Current YBCO Coated Conductors", M. Paranthaman, A. Goyal et al., **Proc. of the 9th International Symposium on Superconductivity**, held Oct. 21-24, Sapporo, Hokkaido, Japan, pgs. 669-672, Springer-Verlag, Tokyo, 1997.
294. "Deposition of Biaxially-Oriented Metal and Oxide Buffer-Layer Films on Textured Tapes: New Substrates for High-Current, High-Temperature Superconductors, Q. He, D. K. Christen, J. D. Budai, E. D. Specht, D. F. Lee, A. Goyal, D. P. Norton, M. Paranthaman, F. A. List and D. M. Kroeger, **Physica C**, 275, 155, 1997.
295. "Reconstruction of Critical Current Flow Patterns and Imaging of Current-Limiting Defects in Polycrystalline High Temperature Superconducting Films", A. E. Pashitski, A. A. Polyanskii, A. Gurevich, D. C. Larbalestier, A. Goyal, E. D. Specht, D. M. Kroeger and E. Tkaczyk and J. A. DeLuca, **Science**, 275, p. 367-369, 1997.
296. "Processing and Long-Range Critical Current Transport in High Temperature Superconductors", D. M. Kroeger, D. F. Lee, A. Goyal and E. D. Specht, in **Synthesis and Properties of Advanced Materials**, Kluwer Academic Publications, 1997, pp. 117-148.
297. "High Critical Current Density Superconducting Tapes By Epitaxial Deposition of YBCO Thick Films on Biaxially Textured Metals", A. Goyal, D. P. Norton, J. D. Budai, M. Paranthaman, E. D. Specht, D. M. Kroeger, D. K. Christen, Q. He, B. Saffian, F. A. List, D. F. Lee, P. M. Martin, C. E. Klabunde, E. Hatfield and V. K. Sikka, **Appl. Phys. Lett.**, vol. 69, No. 12, Sept. 16, 1996.
298. "Percolative Current Flow in High-J_c, Polycrystalline High Temperature Superconductors", A. Goyal, E. D. Specht, D. K. Christen, D. M. Kroeger, A. Pashitski, A. Polyanskii and D. C. Larbalestier, **J. of Metals, Minerals and Materials (JOM)**, vol. 48, No. 10, p.24-29, 1996.
299. "Epitaxial YBCO on Biaxially Textured Nickel (001): An Approach to Superconducting Tapes with high Critical Current Density", D. P. Norton, A. Goyal, J. D. Budai, D. K. Christen, D. M. Kroeger, E. D. Specht, Q. He, B. Saffian, M. Paranthaman, C. Klabunde, D. F. Lee, B. C. Sales and F. A. List, **Science**, 274, 755-757, 1996.
300. "Texture Development in Metals and Intermetallics", A. Goyal, B. Kad and P. Desai, **Invited Overview Report for DARPA**, 1996.
301. "Local Texture, Current Flow, and Superconductive Transport Properties of Tl1223 Deposits on Practical Substrates", D. K. Christen, E. D. Specht, A. Goyal, Q. He, M. Paranthaman, C. E. Klabunde, R. Feenstra, F. A. List, D. M. Kroeger and J. E. Tkaczyk, J. A. Deluca, Z. F. Ren, C. A. Wang and J. H. Wang, **Proceedings of the 10th Anniversary HTS Workshop on Physics**, Materials and Applications, Houston, TX, March 12-16, 1996.
302. "Biaxially Textured Metallic Substrates for High Temperature Superconductors", D. K. Christen, D. P. Norton, A. Goyal, J. D. Budai, Q. He, C. Klabunde, D. M. Kroeger, M. Paranthaman, B. Saffian and E. D. Specht, **Czechoslovak Journal of Physics**, 46, 1531 (1996).
303. "Transport Properties of Tl-1223 Deposits for Possible Conductor Applications", D. K. Christen, Q. He, M. Paranthaman, C. E. Klabunde, R. Feenstra, A. Goyal, F. A. List, E. D. Specht, and D. M. Kroeger, p. 116 in the proceedings of the **Seventh US-Japan Workshop on HTS Materials**, Tsukuba, Japan, October 24-25, 1996.

304. "High- J_c Tl-1223 Thick films on Polycrystalline Ag by Spin Coating", Q. He, D. K. Christen, C. Klabunde, J. E. Tkaczyk, K. W. Lay, M. Paranthaman, J. R. Thompson, A. Goyal, A. J. Perdaza and D. M. Kroeger, **Applied Physics Letters**, 67, 294, 1995.
305. "Percolative Current Paths in High- J_c Bi-2223 Powder-in-tube Tapes", A. Goyal, E. D. Specht, D. M. Kroeger, T. A. Mason, D. J. Dingley, G. N. Riley Jr. and M. W. Rupich, **Appl. Phys. Lett.**, 66 (1995) 1.
306. "Effect of Texture on Grain Boundary Misorientation Distributions in Polycrystalline High Temperature Superconductors", A. Goyal, E. D. Specht, D. M. Kroeger, and T. A. Mason, **Appl. Phys. Lett.**, 68 (1995) 711.
307. "Crystallization of "Colonies" of Locally Aligned Grains During Thallination of Spray-Pyrolyzed Tl-1223", A. Goyal, E. D. Specht and D. M. Kroeger, **Appl. Phys. Lett.**, 67 (1995) 1.
308. "Fabrication, Processing and Superconducting Properties of Tl-1223 Powder-in-tube Conductors" A. Goyal, M. Paranthaman and D. M. Kroeger, **IEEE Transactions in Applied Superconductivity**, vol. 5, pg. 1405, 1995.
309. "Studies on Superplastically Deformed 123/Ag Composites", A. Goyal, Z. L. Wang, D. M. Kroeger and Y. T. Chou, **IEEE Transactions in Applied Superconductivity**, vol. 5, pg. 1452, 1995.
310. "Formation of Colonies of Locally Aligned grains During Thallination of Spray-pyrolyzed $Ba_2Ca_2Cu_3O_x$ Thick Films" A. Goyal, E. D. Specht and D. M. Kroeger, **IEEE Transactions in Applied Superconductivity**, vol. 5, pg 1950, 1995.
311. "Formation of Anisotropic Tl-1223, 2223 and 2212 particles using Aerosol Flow Reacted Particles" M. Paranthaman, A. Goyal and D. M. Kroeger, **IEEE Transactions in Applied Superconductivity**, vol. 5, pg 1490, 1995.
312. "Microtexture and Mesotexture in High- J_c Bi-2223", A. Goyal, E. D. Specht, D. M. Kroeger, T. A. Mason, D. J. Dingley and G. N. Riley, **J. of Electronic Materials**, 24 (1995) 1865. "Effect of the Colony Microstructure on the Transport Critical Current Density of high- J_c Tl-1223 Thick Films", **Proceedings of the 1995 International Workshop on Superconductivity co-sponsored by ISTEC and MRS**, June 18-21, 1995, Maui, USA, pg. 453.
313. "Paths for Current Flow in Polycrystalline High Temperature Superconductors, D. M. Kroeger, A. Goyal and E. D. Specht, **Proceedings of the 1995 International Workshop on Superconductivity co-sponsored by ISTEC and MRS**, June 18-21, 1995, Maui, USA, pg 217.
314. "Superconducting Transport Properties of Tl-1223 Deposits on Polycrystalline Substrates", D. K. Christen, Q. He, M. Paranthaman, C. E. Klabunde, R. Feenstra, A. Goyal, F. A. List, D. M. Kroeger, J. E. Tkaczyk, J. A. Deluca, Z. F. Ren, C. A. Wang and J. H. Wang, **Proceedings of the 1995 International Workshop on Superconductivity co-sponsored by ISTEC and MRS**, June 18-21, 1995, Maui, USA, pg 383.
315. "Texture and Transport in Spray-pyrolyzed Tl-1223 thick Films, J. E. Tkaczyk, J. A. Sutliff, J. A. Deluca, P. J. Bednarczyk, C. L. Briant, Z. L. Wang, A. Goyal and D. M. Kroeger, D. H. Lowndes and E. D. Specht, **J. Mater. Res.**, 10 (1995) 1.
316. "The Effect of Colonies of Aligned Grains on Critical Current in High temperature Superconductors", E. D. Specht, A. Goyal and D. M. Kroeger, J. A. Deluca, J. E. Tkaczyk, C. L. Briant and J. A. Sutliff, **Physica C**, 242 (1995) 164.
317. "Strong and Weak Link Behavior of Single Grain Boundaries in Melt Textured Bulk Ag Doped $YBa_2Cu_3O_x$ ", C. Sarma, G. Schindler, C. C. Koch, A. I. Kingon and A. Goyal, **Physica C**, 244 (1995) 287.
318. "Microstructural Evolution of a Silver Containing Spray-Pyrolyzed 1223 Tl-Ca-Ba-Cu-Oxide Superconductor, C. L. Briant, J. A. Deluca, P. L. Karas, M. F. Garbaskas, J. A. Sutliff, A. Goyal and D. M. Kroeger, **J. Mater. Res.**, 10 (1995) 823.
319. "2D and 3D Percolation in High-Temperature Superconductors", E. D. Specht, A. Goyal and D. M. Kroeger, **Phys. Rev. B**, 53, pgs. 3585-3589, 1995.
320. "Microdiffraction Measurements of the Effects of Grain Alignment on Critical

- Current in High Temperature Superconductors”, **NLS Annual Report**, E. D. Specht and A. Goyal, 1995.
321. “Progress Towards Bulk Application of High-T_c Superconductors”, A. Goyal, **J. of Minerals, Metals and Materials**, Pg. 55, August, 1995.
322. “Dependence of Critical Current Density on Microstructure in High Temperature Superconductors”, A. Goyal, D. M. Kroeger, E. D. Specht and Z. L. Wang, **J. of Electronic Materials**, 23 (1994) 1191.
323. “A New Process to Texture Y123”, V. Selvamanickam, A. Goyal and D. M. Kroeger, **J. of Electronic Materials**, 23 (1994) 1169.
324. “A New Process to Texture YBa₂Cu₃O_{7-x} Superconductor”, V. Selvamanickam, A. Goyal and D. M. Kroeger, Published as proceedings of 1994 Applied Superconductivity Conference, Oct 16-21, 1994, Boston, MA, in **IEEE Transactions**.
325. “Local Texture and Grain Boundary Misorientations in High J_c Oxide Superconductors”, D. M. Kroeger, A. Goyal, E. D. Specht, J. E. Tkaczyk, J. Sutliff, J. A. Deluca, G. N. Riley Jr., and L. Masur, **J. of Superconductivity**, 1995.
326. “Processing/Microstructure Control for High Strength, Ductility, and Toughness at Room Temperature in P/M FeAl”, P. J. Maziasz, V. Sikka, D. J. Alexander, A. Goyal and J. W. Wright, published in the **Proceedings of the 1996 Spring TMS Meeting**, Anaheim, CA, Feb 2-6, 1996.
327. “Local Texture and Percolative Paths for Long-Range Current Conduction in High Critical Current Density TlBa₂Ca₂Cu₃O_{8+x} Deposits”, D. M. Kroeger, A. Goyal, E. D. Specht, Z. L. Wang, J. E. Tkaczyk, J. A. Sutliff and J. A. Deluca, **Appl. Phys. Lett.**, 64 (1994) 106-108.
328. “Evidence for local texture in Spray-Pyrolyzed Tl-1223 Thick Films”, E. D. Specht, A. Goyal, D. M. Kroeger, C. L. Briant, J. A. Deluca, J. A. Sutliff and J. E. Thaczyk, **Physica C**, 226 (1994) 76-84.
329. “Effect of Thermal Annealing on Grain Boundary Chemistry of Polycrystalline TlBa₂Ca₂Cu₃O_{8+x} Films”, Z. L. Wang, C. L. Briant, J. Deluca, A. Goyal, D. M. Kroeger, J. A. Sutliff, E. D. Specht and J. E. Thaczyk, published in the **Proceedings of the Microscopy Society of America**, July 31-Aug 5, 1994, New Orleans, LA.
330. “The Path for Long Range Conduction in High J_c TlBa₂Ca₂Cu₃O_{8+x} Deposits”, D. M. Kroeger, A. Goyal, E. D. Specht, Z. L. Wang, J. E. Thaczyk, J. A. Sutliff and J. A. Deluca, **Proceedings of the 1993 TMS Fall Meeting**, Oct. 17-21, Pittsburgh, PA, edited by U. Balachandran, E. W. Collings and A. Goyal.
331. “Progress in the Development of the Silver Addition Process for Preparing Textured “1223” Tl-Ca-Ba-Cu-O Thick Films”, J. A. Deluca, P. L. Karas, C. L. Briant, J. E. Thaczyk and A. Goyal, **Proceedings of the 1993 TMS Fall Meeting**, Oct. 17-21, Pittsburgh, PA, edited by U. Balachandran, E. W. Collings and A. Goyal.
332. “Long Range Conduction in High J_c TlBa₂Ca₂Cu₃O_{8+x} Deposits”, D. M. Kroeger, A. Goyal, E. D. Specht, Z. L. Wang, J. E. Thaczyk, J. A. Sutliff and J. A. Deluca, **Proceedings of the 1993 TcSUH Meeting**, Dec. 5-6, Houston, TX.
333. “A New Process to Texture YBa₂Cu₃O_{7-x} Superconductor”, V. Selvamanickam, A. Goyal and D. M. Kroeger, **Appl. Phys. Lett.**, 65 (1994) 639.
334. “Advances in Processing of High-T_c Superconductors for Bulk Applications”, A. Goyal, **J. of Minerals, Metals and Materials**, pg. 14-20, December, 1994.
335. “Models for Long-range Current Flow in Bulk Oxide Superconductors”, A. Goyal and D. M. Kroeger, **J. of Minerals, Metals and Materials**, pg. 11, December, 1994.
336. “Microstructures and Flux-pinning in Melt-processed 123”, Z. L. Wang, A. Goyal, R. Kontra and D. M. Kroeger, **Materials Science Forum**, 129 (1993) 1-16.
337. “Interface and Grain Boundary Chemical Structures in YBaCuO materials”, Z. L. Wang, R. Kontra, A. Goyal, D. M. Kroeger and R. K. Williams, Special Issue of “Interface Science” on **Interfaces in High-Temperature Superconductors**, edited by S. E. Babcock and K. L. Merkle, vol 1, 321-338, 1994.
338. “Microdiffraction Measurements of Correlation’s in Grain Orientation in High Current, High temperature Superconductors”, E. D. Specht, A. Goyal, D. M.

- Kroeger, Z. L. Wang, J. E. Tkaczky and J. A. Deluca, **NSLS Annual Report**, 1993.
339. "Flux-creep studies in $\text{YBa}_2\text{Cu}_3\text{O}_{7-\delta}$," Y. R. Sun, J. R. Thompson, D. K. Christen, Y. J. Chen, J. G. Ossandon, F. Holtzberg, A. D. Marwick and A. Goyal, *High Temp. Supercond.*, **Proc. 3rd Beijing Int. Conf.**, eds: Z. Gan, S. S. Xie and Z. X. Zhao, p609, 1993.
340. "Critical Currents and Microstructures in Oxide Superconductors," D. M. Kroeger and A. Goyal, **J of Metals**, p. 42-46, Oct. 1992.
341. "Stacking Faults Associated with 211 Particles and other Likely Pinning Centers in Melt-processed $\text{YBa}_2\text{Cu}_3\text{O}_{7-\delta}$," A. Goyal, Z. L. Wang, K. B. Alexander and D. M. Kroeger, Published in the Proceedings of the **International Workshop on Superconductivity**, June 23-26, 1992, Honolulu, Hawaii, U. S. A.
342. "Microstructure and Growth of Melt-textured $\text{YBa}_2\text{Cu}_3\text{O}_{7-\delta}$," K. B. Alexander, A. Goyal, D. M. Kroeger, S. Selvamani, **Physical Review B**, 45 (1992) 5622.
343. "Fabrication of Highly Aligned $\text{YBa}_2\text{Cu}_3\text{O}_{7-\delta}$ -Ag Composites," A. Goyal, P. D. Funkenbusch, D. M. Kroeger, and S. J. Burns, **Physica C**, 182 (1992) 203.
344. "Hardness and Fracture Toughness of Highly Aligned $\text{YBa}_2\text{Cu}_3\text{O}_{7-\delta}$," A. Goyal, P. D. Funkenbusch, D. M. Kroeger, and S. J. Burns, **J. of Applied Physics**, 71 (1992) 2363.
345. "Mechanical Properties of Highly Aligned $\text{YBa}_2\text{Cu}_3\text{O}_{7-\delta}$: Effect of Y_2BaCuO_5 Particles," A. Goyal, P. D. Funkenbusch, D. M. Kroeger, and S. J. Burns, **Physica C**, 183 (1992) 221.
346. "Solidification of $\text{YBa}_2\text{Cu}_3\text{O}_{7-\delta}$ From the Melt" A. Goyal, K. B. Alexander, D. M. Kroeger, P. D. Funkenbusch, and S. J. Burns, **Physica C**, 210 (1993) 197.
347. "Structural and Chemical Disorder near the 211/123 Interface and its possible relation to the Flux-pinning behavior in Melt-textured $\text{YBa}_2\text{Cu}_3\text{O}_{7-\delta}$," Z. L. Wang, A. Goyal, and D. M. Kroeger, **Physical Review B**, 47 (1992) 5373.
348. "Substrate Reactions and Flux-pinning Structures in Melt-processed $\text{YBa}_2\text{Cu}_3\text{O}_{7-\delta}$ Deposits on Ag-Pd Substrates", D. M. Kroeger, A. Goyal, Z. L. Wang, and F. A. List, Published in the **Proceedings of the 1992 T_cSUH Workshop on HTS Materials**, February 27-28, Houston, Texas.
349. "Effects of Field Sweep Rate on the Magnetization in High-T_c Superconductor Materials", Yang Ren Sun, J. R. Thompson, D. K. Christen, J. G. Ossandon, Y. J. Chen and A. Goyal, **Physical Review B**, 46 (1992) 8480.
350. "Strong Evidence for Vortex Glass/Collective Pinning Theory in $\text{YBa}_2\text{Cu}_3\text{O}_{7-\delta}$ ", Yang Ren Sun, J. R. Thompson, Y. J. Chen, D. K. Christen, and A. Goyal, **Physical Review B**, 47 (1993) 14481.
351. "Defects near the $\text{Y}_2\text{BaCuO}_x/\text{YBa}_2\text{Cu}_3\text{O}_{7-\delta}$ Interface and its effect on Flux-pinning in Melt-processed and Quench-Melt-Growth Processed $\text{YBa}_2\text{Cu}_3\text{O}_{7-\delta}$ ", Z. L. Wang, A. Goyal, D. M. Kroeger and T. M. Armstrong, Published in the **Proceedings of the 1992 Spring MRS Meeting**, San Francisco, CA.
352. "Flux-pinning Structures in Melt-processed $\text{YBa}_2\text{Cu}_3\text{O}_{7-\delta}$ ", D. M. Kroeger, Z. L. Wang and A. Goyal, Published in the **Proceedings of the 5th US/Japan Workshop on High-T_c Superconductors**, Tokyo, Japan, Nov 9-10, 1992.
353. "The Production and Properties of Melt-Zone Textured $\text{YBa}_2\text{Cu}_3\text{O}_{7-\delta}$ Filaments", D.K. Christen, C. E. Klabunde, M. J. Neal, M. V. Parish, D. B. Chandler, B. C. Chakoumakos, A. Goyal and D. M. Kroeger, Published in the **Proceedings of the International Workshop on Superconductivity**, June 23-26, 1992, Honolulu, Hawaii, U. S. A.
354. "Interface Microstructures in Melt-textured 123 on Ag-Pd and Flux-pinning centers introduced by 211 particles," Z. L. Wang, A. Goyal and D. M. Kroeger, proceedings of the **50th Annual Meeting of the Electron Microscopy Society of America**, held in Boston, MA, August, 1992.
355. "Effect of Ag/Ag₂O Additions on the Resistive Behavior of Polycrystalline $\text{YBa}_2\text{Cu}_3\text{O}_{7-\delta}$ in the Low Temperature Sintering Regime," A. Goyal, S. J. Burns, and P. D. Funkenbusch, **Physica C**, 168 (1990), 405.
356. "Crystallographic Thermal Expansion Coefficient and Elasticity Across the

	<p>Superconducting Transition in $\text{YBa}_2\text{Cu}_3\text{O}_{7-\delta}$," S. J. Burns, A. Goyal, and P. D. Funkenbusch, Physical Review B, 39 (1989) 11457.</p> <p>357."Discontinuity of the Isothermal Elastic Compliances Across the Superconducting Transition in $\text{YBa}_2\text{Cu}_3\text{O}_{7-\delta}$," A. Goyal, S. J. Burns, S. Gracewski, and P. D. Funkenbusch, Physica C, 159 (1989) 313.</p> <p>358."The Effect of Ag/Ag₂O Doping on the Low Temperature Sintering of Superconducting Composites," A. Goyal, S. J. Burns, and P. D. Funkenbusch, Superconductivity and its Applications, edited by H. S. Kwok and D. T. Shaw, Elsevier Science, 1989.</p> <p>359."Young's Modulus Measurement of Polycrystalline $\text{YBa}_2\text{Cu}_3\text{O}_{7-\delta}$," G. C. S. Chang, S. J. Burns, A. Goyal, and P. D. Funkenbusch, Ceramic Superconductors II, edited by Man F. Yan, American Ceramic Society, 1988, pp 580.</p> <p>360."Superconducting Cermets," A. Goyal, P. D. Funkenbusch, and S. J. Burns, Superconductivity and its Applications, edited by H. S. Kwok and D. T. Shaw, Elsevier Science, 1988.</p> <p>361."Isostructural Phase Transition in $\text{YBa}_2\text{Cu}_3\text{O}_{7-\delta}$ with the Onset of Superconductivity," S. J. Burns, A. Goyal, and P. D. Funkenbusch, Scripta Metallurgica, 22 (1988) 1129.</p> <p>362."Critical Point Phase Transformations Applied to Ceramic Superconductors," S. J. Burns, A. Goyal, and P. D. Funkenbusch, Superconductivity and its Applications, edited by H. S. Kwok and D. T. Shaw, Elsevier Science, 1988.</p> <p>363."Cermets of the Phase Superconductor," A. Goyal, P. D. Funkenbusch, G. C. S. Chang, and S. J. Burns, Materials Letters, 6 (1988) 257.</p>
--	--