

## FY 1997 Presentations and Publications

---

- Bhattacharya, R. N., A. Natarajan, C. M. Carlson, P. A. Parilla, and D. S. Ginley (National Renewable Energy Laboratory), M. Paranthaman, A. Goyal, and D. M. Kroeger (ORNL), "Thick-Film Processing for Tl-Oxide Wire and Tape," paper presented to the International Workshop on Tl- and Hg-Based Superconducting Materials, University of Cambridge, United Kingdom, May 25–28, 1997, and to be published in the workshop proceedings by the *J. Supercond.*
- Christen, D. K., H. R. Kerchner, 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, E. D. Specht, and M. F. Chisholm (ORNL), "Superconducting Transport Properties of High  $J_c$  Biaxially Aligned  $\text{YBa}_2\text{Cu}_3\text{O}_{7-\delta}$  Deposits on Metallic Tape Substrates," extended abstract submitted for the 1997 International Workshop on Superconductivity, International Superconductivity Technology Center/Materials Research Society Workshop, Big Island, Hawaii, June 14–18, 1997.
- Christen, D. K., 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 (ORNL), "Fabrication and Properties of High  $J_c$  Biaxially Aligned  $\text{YBa}_2\text{Cu}_3\text{O}_{7-\delta}$  Thick Films on Metallic Tape Substrates," submitted to Proceedings of the International Workshop on Critical Currents in Superconductors for Practical Applications, Xian, China, March 6–8, 1997.
- Demko, J. A. (ORNL), and S. D. Augustynowicz and J. P. Wikstrom (MVE, Inc., New Prague, Minn.), "Cryogenic Vessels: Heat Transfer Analysis of Penetrations," paper submitted to 11th Intersociety Cryogenic Symposium, Energy Week Conference and Exhibition, Houston, January 1997.
- Demko, J. A., J. W. Lue, and M. S. Lubell (ORNL), U. Sinha and J. Tolbert (Southwire), and L. Dresner (consultant), "Test Results for Different High Temperature Superconducting Transmission Cable Prototypes," paper presented at and to be published in Proceedings of International Cryogenic Materials Conference/Cryogenic Engineering Conference, Portland, Oreg., July 28–August 1, 1997.
- Goyal, A., D. P. Norton, M. Paranthaman, J. D. Budai, E. D. Specht, D. K. Christen, D. M. Kroeger, Q. He., B. Saffian, F. A. List, D. F. Lee, C. E. Klabunde, and P. M. Martin (ORNL), "Fabrication of High Critical Current Density Superconducting Tapes by Epitaxial Deposition of YBCO Thick Films on Biaxially Textured Metal Substrates," p. 685 in *Proceedings of 9th International Symposium on Superconductivity (ISS 96), Sapporo, Japan, October 21–24, Advances in Superconductivity IX*, October 21–24, 1996.
- Goyal, A., D. P. Norton, M. Paranthaman, E. D. Specht, Q. He, F. A. List, D. M. Kroeger, D. K. Christen, and J. D. Budai (ORNL), "Low Cost, Single Crystal-like Substrates for Practical, High Efficiency Solar Cells," to be published in Proceedings of the Future Generation Photovoltaics Technologies Conference, hosted by the National Renewable Energy Laboratory (NREL), Denver, March 24–28, 1997.
- Goyal, A., E. D. Specht, and D. M. Kroeger (ORNL), "Grain Boundary Networks and Percolative Current Flow in Polycrystalline HTS Conductors," paper submitted to Proceedings of the International Symposium on Superconductivity, Sapporo, Japan, October 21–24, 1996.

#### 4-2 FY 1997 Presentations and Publications

---

- Goyal, A., D. P. Norton, D. K. Christen, D. M. Kroeger, E. D. Specht, M. Paranthaman, J.D. Budai, Q. He, F. A. List, D. F. Lee, B. Saffian, J. Mathis, E. Hatfield, C. E. Klabunde, S. Shoup, and P. M. Martin (ORNL), "Status of the RABiTS Approach to Fabricate Biaxially-Aligned, High  $J_c$  Superconductor," abstract submitted to the Spring 1997 Materials Research Society Meeting, San Francisco, March 31–April 4, 1997.
- Goyal, A., E. D. Specht, D. M. Kroeger (ORNL), and Z. L. Wang (Georgia Institute of Technology), "Grain Boundary Studies of High-Temperature Superconducting Materials Using Electron Backscatter Kikuchi Diffraction," *Ultramicroscopy* **67**, 35–57, June 1, 1997.
- Goyal, A., E. D. Specht, D. K. Christen, D. M. Kroeger (ORNL), A. Pashitski, A. Polyanskii, and D. C. Larbalestier (University of Wisconsin), "Percolative Current Flow in High- $J_c$ , Polycrystalline High- $T_c$  Superconductors," *J. Met.* **48** (10), 24–29 (October 1996).
- Guo, L. P., Z. F. Ren, J. Y. Lao, and J. H. Wang (SUNY-Buffalo) and D. K. Christen, C. E. Klabunde and J. D. Budai (ORNL), "Epitaxial Superconducting Thin Films  $Tl_{0.78}Bi_{0.22}Sr_{1.6}Ba_{0.4}Ca_2Cu_3O_{9-\delta}$  on (001) YSZ Synthesized by Laser Ablation and Post-Annealing in Pure Argon," *Physica C*, **277**, 13–18 (1997).
- He, Q., 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 (ORNL), "Deposition of Biaxially-Oriented Metal and Oxide Buffer-Layer Films on Textured Ni Tapes: New Substrates for High-Current, High-Temperature Superconductors," *Physica C* **275**, 151–161 (1997).
- Kroeger, D. M., D. P. Norton, D. K. Christen, A. Goyal, J. D. Budai, C. Park, E. D. Specht, Q. He, M. Paranthaman, D. F. Lee, and F. A. List (ORNL), "High-Temperature Superconductor Coated Conductors," invited abstract submitted to the International Cryogenic Materials Conference/Cryogenic Engineering Conference, Portland, Oreg., July 28–August 1, 1997.
- Lee, D. F., P. M. Martin, and D. M. Kroeger (ORNL) and M. W. Rupich, Q Li, and G. N. Riley, Jr. (American Superconductor), "Effects of Initial Cold Work Conditions on the Deformation and Current Capacity of Monofilamentary and Multifilamentary Bi-2223 Conductors," *Supercond. Sci. Technol.* **10** (9), 702 (September 1997).
- Lee, D. F., M. Paranthaman, F. A. List, E. D. Specht, A. Goyal, P. M. Martin, and D. M. Kroeger (ORNL), "Nonvacuum Chemical Deposition of YBCO Films on Rolling-Assisted Biaxially-Textured Substrates" abstract submitted to Spring 1997 Materials Research Society Meeting, San Francisco, March 31–April 4, 1997.
- List, F. A., P. M. Martin, and D. M. Kroeger (ORNL), "An Automated System for Current-Voltage Characterization of Ceramic Superconductors," *Rev. Sci. Instrum.* **67** (9), 3187-3192 (September 1996).
- Lue, J. W., D. A. Demko, and M. S. Lubell (ORNL), M. Tomsic (Plastronic), and U. Sinha (Southwire), "Development of Strengthened Bundle High Temperature Superconductors," paper presented at and to be published in Proceedings of International Cryogenic Materials Conference/Cryogenic Engineering Conference, Portland, Oreg., July 28–August 1, 1997.

- Natarajan, A., W. Wang, and E. Ma (Louisiana State University), R. N. Bhattacharya (NREL), C. Khan-Malek (Louisiana State University), and M. Paranthaman and P. M. Martin (ORNL), "Electrodeposition of High- $T_c$  Superconductor Material for Microsensor Fabrication," paper submitted to Proceedings of the Materials Research Society Fall Meeting, Boston, December 1–6, 1996.
- Norton, D. P., A. Goyal, J. D. Budai, D. K. Christen, D. M. Kroeger, E. D. Specht, Q. He, B. Saffian, M. Paranthaman, C. E. Klabunde, D. F. Lee, B. C. Sales, and F. A. List (ORNL), "Epitaxial  $\text{YBa}_2\text{Cu}_3\text{O}_7$  on Biaxially Textured (001) Ni: An Approach to High Critical Current Density Superconducting Tapes," *Science* **274**, 755 (1996).
- Norton, D. P., D. K. Christen, A. Goyal, J. D. Budai, D. M. Kroeger, C. Park, E. D. Specht, Q. He, M. Paranthaman, D. F. Lee, and F. A. List (ORNL), "High Critical Current Y-123 Thick Films on Industrial Scalable Substrates for Conductor Applications," invited abstract submitted to the International Cryogenic Materials Conference/Cryogenic Engineering Conference, Portland, Oreg., July 28–August 1, 1997.
- Paranthaman, M., A. Goyal, D. P. Norton, F. A. List, E. D. Specht, D. K. Christen, D. M. Kroeger, J. D. Budai, Q. He, B. Saffian, D. F. Lee, and P. M. Martin (ORNL), "Development of Biaxially-Textured Buffer Layers on Rolled Ni Substrates for High Current  $\text{YBa}_2\text{Cu}_3\text{O}_{7-y}$  Coated Conductors," p. 669 in *Proceedings of 9th International Symposium on Superconductivity (ISS 96), Sapporo, Japan, October 21–24, Advances in Superconductivity IX*, October 21–24, 1996.
- Paranthaman, M., F. A. List, D. P. Norton, A. Goyal, E. D. Specht, D. K. Christen, D. M. Kroeger, J. D. Budai, Q. He, D. F. Lee, and P. M. Martin (ORNL), "Development of High Current  $\text{YBa}_2\text{Cu}_3\text{O}_{7-y}$  Coated Conductors on Rolled-Ni Substrates," abstract submitted to Materials Research Society 1997 Spring Meeting, San Francisco, March 31–April 4, 1997.
- Paranthaman, M., A. Goyal, F. A. List, E. D. Specht, D. F. Lee, P. M. Martin, Q. He, D. K. Christen, D. P. Norton, J. D. Budai, and D. M. Kroeger (ORNL), "Growth of Biaxially Textured Buffer Layers on Rolled-Ni Substrates by Electron Beam Evaporation," *Physica C* **275**, 266–272 (1997).
- Paranthaman, M., F. A. List, A. Goyal, E. D. Specht, C. E. Ballet, D. M. Kroeger, and D. K. Christen (ORNL), "Growth of  $\text{TlBa}_2\text{Ca}_2\text{Cu}_3\text{O}_{9-y}$  Superconducting Films with Local Biaxial Alignment Extending up to 5 mm on Ag Substrates Using a Spray-Pyrolysis Technique," *J. Mater. Res.*, **12** (3) (March 1997).
- Paranthaman, M., S. S. Shoup (now at MicroCoating Technologies), D. B. Beach, R. K. Williams, and E. D. Specht (ORNL), "Epitaxial Growth of  $\text{BaZrO}_3$  Films on Single Crystal Oxide Substrates Using Sol-Gel Alkoxide Precursors," paper submitted to *Mater. Res. Bull.*
- Paranthaman, M., A. Goyal, F. A. List, D. F. Lee, E. D. Specht, D. M. Kroeger, P. M. Martin, J. E. Mathis, D. K. Christen, D. P. Norton, J. D. Budai, Q. He, and C. Park (ORNL), "Growth of Biaxially Textured Buffer Layers on Rolled-Ni Substrates for High Current  $\text{YBa}_2\text{Cu}_3\text{O}_{7-x}$ ," abstract submitted to the Materials Research Society Fall Meeting, Boston, December 1–5, 1997.

#### 4-4 FY 1997 Presentations and Publications

---

- Pashitski, A. E., A. Gurevich, A. A. Polyanski, and D. Larbalestier (University of Wisconsin), A. Goyal, E. D. Specht, and D. M. Kroeger (ORNL), and J. A. DeLuca and J. E. Tkaczyk (General Electric), "Reconstruction of Current Flow and Imaging of Current-Limiting Defects in Polycrystalline Superconducting Films," *Science*, **275** (January 17, 1997).
- Ren, S. X., E. A. Kenik, K. B. Alexander, and A. Goyal (ORNL), "Exploring Spatial Resolution in EBSD Experiments via Monte Carlo Simulation," paper submitted to *J. Microsc.*
- Schwenterly, S. W., M. T. McFee, and J. A. Demko (ORNL), "Design and Verification Tests on a High-Voltage Lead for a Superconducting Transformer," abstract submitted to the International Cryogenic Materials Conference/Cryogenic Engineering Conference, Portland, Oreg., July 28–August 1, 1997.
- Shoup, S. S. (MicroCoating Technologies), M. Paranthaman, D. B. Beach, E. D. Specht, and R. K. Williams (ORNL), "Sol-Gel Synthesis of LaAlO<sub>3</sub>; Epitaxial Growth of LaAlO<sub>3</sub> Thin Films on SrTiO<sub>3</sub> (100)," *J. Mater. Res.*, **12** (4) (April 1997).
- Singhal, A., M. Paranthaman, D. B. Beach, E. D. Specht, A. Goyal, F. A. List, D. F. Lee, and D. M. Kroeger (ORNL), "Sol-Gel Processing of YBa<sub>2</sub>Cu<sub>3</sub>O<sub>7-x</sub> Superconductors," abstract submitted to the Materials Research Society Fall Meeting, Boston, December 1–5, 1997.
- Specht, E. D., A. Goyal, and D. M. Kroeger (ORNL) and A. Mogro-Campero, P. J. Bednarczyk, J. E. Tkaczyk, and J. A. DeLuca (General Electric), "Critical Current, Film Thickness and Grain Alignment for Spray-Pyrolyzed Films of TlBa<sub>2</sub>Ca<sub>2</sub>Cu<sub>3</sub>O<sub>x</sub>," *Physica C* **270**, 91–96 (1996).
- Specht, E. D., A. Goyal, D. P. Norton, M. Paranthaman, Q. He, D. K. Christen, C. Park, F. A. List, D. M. Kroeger, J. D. Budai, D. F. Lee, J. E. Mathis, E. C. Hatfield, and P. M. Martin (ORNL), "Stability of Epitaxially Grown Superconducting Films on Biaxially Textured Metal Substrates," abstract submitted to the Materials Research Society Fall Meeting, Boston, December 1–5, 1997.
- Tirumala, S., and K. Salama (Texas Center for Superconductivity at the University of Houston), and D. F. Lee and D. M. Kroeger (ORNL), "Thermomechanical Processing and Reaction Kinetics of Bi-2223 Powder-In-Tube Tapes Made from Aerosol Precursor," *Supercond. Sci. Technol.* **10** (9), 686 (September 1997).
- Williams, R. K., J. M. Schmitz, J. O. Scarbrough, and J. R. Thompson (ORNL), "Thermal Conductivity of Polycrystalline YBa<sub>2</sub>Cu<sub>4</sub>O<sub>8</sub> from 10 to 300 K," paper submitted to *Phys. Rev.*