

# IEEE TRANSACTIONS ON APPLIED SUPERCONDUCTIVITY

A PUBLICATION OF THE IEEE COUNCIL ON SUPERCONDUCTIVITY

JUNE 2011

VOLUME 21

NUMBER 3

ITASE9

(ISSN 1051-8223)

## PART III OF THREE PARTS

THE 2010 APPLIED SUPERCONDUCTIVITY CONFERENCE  
Washington, DC, August 1–6, 2010

### MATERIALS

---

#### Plenary Papers

- Future Directions for Cuprate Conductors ..... *J. L. MacManus-Driscoll and S. C. Wimbush* 2495

---

#### LTS Materials

##### Cables and Leads

- Direct Measurement of Inter-Filament Resistance in Superconducting Multifilamentary NbTi and Nb<sub>3</sub>Sn Strands ..... *C. Zhou, E. P. A. van Lanen, D. Veldhuis, H. H. J. ten Kate, M. Dhallé, and A. Nijhuis* 2501  
Performance Characterization of Russian ITER Nb<sub>3</sub>Sn Strands ..... *R. Vasilyev, N. Kozlenkova, A. Vorobyeva, V. Pantsyrny, and A. Nijhuis* 2505  
3D Stress-Strain Model of the Nb<sub>3</sub>Sn Wire ..... *J. Chen, K. Han, and P. N. Kalu* 2509  
Three-Dimensional Strain Model for Various Kinds of Nb<sub>3</sub>Sn Wires ..... *H. Oguro, S. Awaji, K. Watanabe, G. Nishijima, T. Ishigaki, A. Hoshikawa, K. Iwase, M. Yonemura, and D. S. Adipranoto* 2513  
Fabrication of Long-Length Nb<sub>3</sub>Al Wire by the Metastable Solid-Solution-Strand Restacking Method ..... *N. Banno, T. Takeuchi, K. Tsuchiya, and K. Nakagawa* 2517  
Development of Ta-matrix Nb<sub>3</sub>Al Strand and Cable for High-Field Accelerator Magnet ..... *K. Tsuchiya, A. Kikuchi, T. Takeuchi, N. Banno, Y. Iijima, S. Nimori, H. Takigawa, A. Terashima, T. Nakamoto, Y. Kuroda, M. Maruyama, T. Takao, K. Tanaka, K. Nakagawa, E. Barzi, R. Yamada, A. Zlobin, and A. Ghosh* 2521  
Superconducting Properties and Microstructure of V<sub>3</sub>Ga Wires Using High Ga Content TiGa<sub>3</sub> and V<sub>2</sub>Ga<sub>5</sub> Compounds ..... *Y. Hishinuma, A. Kikuchi, Y. Iijima, T. Takeuchi, K. Matsuda, H. Taniguchi, and A. Nishimura* 2525  
Development of a Multifilament PIT V<sub>3</sub>Ga Conductor for Fusion Applications ..... *J. S. Distin, L. R. Motowidlo, P. J. Lee, D. C. Larbalestier, A. K. Ghosh, X. F. Lu, N. Cheggour, T. C. Stauffer, and L. F. Goodrich* 2529  
Structure and Performance of Nb<sub>3</sub>Sn Superconducting Wires Prepared From Sn-Based Alloy Sheets ..... *K. Tachikawa, T. Ando, H. Sasaki, M. Yamaguchi, and T. Takeuchi* 2533

(Contents Continued on Page 2486)

Longitudinal and Transverse Cross-Sectional Microstructure and Critical Current Density in Nb <sub>3</sub> Sn Superconductors .....	2537
Electron Backscatter Diffraction Analysis on Nb <sub>3</sub> Sn and Nb <sub>3</sub> Al Multifilaments .....	2541
New Developments in Nb <sub>3</sub> Sn PIT Strand: The Effects of Titanium and Second Phase Additions on the Superconducting Properties .....	2546
Analysis of Bulk and Thin Film Model Samples Intended for Investigating the Strain Sensitivity of Niobium-Tin .....	2550
Coarse Nb <sub>3</sub> Sn Grain Formation and Phase Evolution During the Reaction of a High Sn Content Internal Tin Strand ....	2554
Strain and Magnetization Properties of High Subelement Count Tube-Type Nb <sub>3</sub> Sn Strands .....	2559
Design Aspects of Dual Nb-Ta Sheet Diffusion Barriers for rmNb <sub>3</sub> rmSn Conductors .....	2563
Results of Investigations of 500 kg Nb <sub>3</sub> Sn Bronze Strand Produced in Russian Federation for ITER Project .....	2567
Quality Assurance Tests of Nb <sub>3</sub> Sn Wires for the Series-Connected Hybrid Magnets .....	2571
Development of Nb <sub>3</sub> Sn Internal Tin Strands With Enhanced Current Capacity and Improved Mechanical Properties ....	2575
Observations on Titanium Diffusion in ITT Type Nb <sub>3</sub> Sn Superconductors ....	2579
Influences of Different ECAE Routes on Filament Deformation in Cu Clad Nb Composite Wires .....	2584
A Model to Study Plastic Deformation in RRP Nb <sub>3</sub> Sn Wires .....	2588
Low Critical Current Sensitivity of RHQT Nb <sub>3</sub> Al Wires Under Transverse Compressive Stress Up to 300 MPa .....	2593
Amorphous and Crystalline Magnetic/Superconducting Hybrids: Interplay Between Periodic Defects and Random Defects .....	2597
Characterization of Field Penetration in Superconducting Multilayers Samples .....	2601
Effects of Material Properties on the Elastoplastic Buckling of an SRF Cavity Under External Pressure .....	2605
M.-C. Lin, C. Wang, T. Furuya, T.-T. Yang, M.-S. Yeh, L.-H. Chang, C.-K. Liu, F.-T. Chung, M.-H. Tsai, M.-H. Chang, Y.-H. Lin, C.-H. Lo, T.-C. Yu, and L.-J. Chen Impact of Forming, Welding, and Electropolishing on Pitting and the Surface Finish of SRF Cavity Niobium .....	2615
L. D. Cooley, D. Burk, C. Cooper, N. Dhanaraj, M. Foley, D. Ford, K. Gould, D. Hicks, R. Novitski, A. Romanenko, R. Schuessler, C. Thompson, and G. Wu Nonlinear Near-Field Microwave Microscope for RF Defect Localization in Superconductors .....	2619
T. Tai, X. X. Xi, C. G. Zhuang, D. I. Mircea, and S. M. Anlage Evidence of Surface Paramagnetism in Niobium and Consequences for the Superconducting Cavity Surface Impedance ..	
T. Proslier, M. Kharitonov, M. Pellin, J. Zasadzinski, and G. Civati Low Critical Current Sensitivity of RHQT Nb <sub>3</sub> Al Wires Under Transverse Compressive Stress Up to 300 MPa .....	

**HTS Materials****MgB<sub>2</sub> Materials**

Raman Spectroscopy: Alternate Method for Strain and Carbon Substitution Study in MgB <sub>2</sub> .....	2623
Optimizing C Incorporation Into Magnesium Diboride .....	2627
Fabrication and Superconducting Properties of MgB <sub>2</sub> Doped With Polysiloxane Based Copolymers .....	2631
Evolution of Electromagnetic Properties and Microstructure With Sintering Temperature for MgB <sub>2</sub> /Fe Wires Made by Combined In-Situ/Ex-Situ Process .....	2635
MgB <sub>2</sub> Superconductors With Addition of Other Diborides and SiC .....	2639
Superconducting Properties of Diffusion-Processed Multifilamentary MgB <sub>2</sub> Wires .....	2643

A New Generation of <i>In Situ</i> MgB <sub>2</sub> Wires With Improved J <sub>c</sub> and B <sub>irr</sub> Values Obtained by Cold Densification (CHPD) .....	2649
Microstructure of the MgB <sub>2</sub> Wires Resulting by the Infiltration Process .....	2655
Comparison on Effects of B <sub>4</sub> C, Al <sub>2</sub> O <sub>3</sub> , and SiC Doping on Performance of MgB <sub>2</sub> Conductors .....	2659
Detrimental Effects Depending on the Sheath Materials in Ex Situ Processed Heat Treated MgB <sub>2</sub> Wires and Tapes .....	2664
Microstructure in High-Density MgB <sub>2</sub> Wires Prepared by an Internal Mg Diffusion Method .....	2668
Effects of the Size of the Doped SiC Nanoparticles on the Critical Current Density of the Ti-Sheathed MgB <sub>2</sub> Superconducting Wires .....	2672
Effect of the Powder Strain State on the Mechanical Properties of MgB <sub>2</sub> Tapes .....	2676
Enhanced Connectivity and Percolation in Binary and Doped In Situ MgB <sub>2</sub> Wires After Cold High Pressure Densification .....	2680
Improving Superconducting Properties of MgB <sub>2</sub> by Graphene Doping .....	2684
Magnetic Field Trapping in MgB <sub>2</sub> Bulks and Inserts .....	2690
High-Pressure Synthesized Nanostructural MgB <sub>2</sub> Materials With High Performance of Superconductivity, Suitable for Fault Current Limitation and Other Applications .....	2694
<b>ReBCO Materials</b>	
Seeded Infiltration and Growth of Bulk YBCO Nano-Composites .....	2698
Mass Production of Low-Cost GdBaCuO Bulk Superconductors Using a Novel Seed in the Batch Process .....	2702
New Approaches for Enhancement of J <sub>c</sub> for RE123 Melt-Solidified Bulks .....	2706
Effect of Sol-Gel Derived Nano-Scale Y <sub>2</sub> Ba <sub>4</sub> CuAgO <sub>y</sub> Addition in Bulk Y-Ba-Cu-O Superconductors .....	2710
Enhancement of the Critical Current Densities and Trapped Flux of Gd-Ba-Cu-O Bulk HTS Doped With Magnetic Particles .....	2714
Preparation and Properties of High-Quality Melt Growth Gd123 Bulks With Low Void Density: Flexural Strength at 77 K .....	2718
Analysis of Temperature and Magnetic Field Distribution in Superconducting Bulk During Pulsed Field Magnetization ..	2723
Correlation Between Enhanced T <sub>c</sub> , AC Magnetic Irreversibility Line and Heat Treatment in High T <sub>c</sub> Superconductors ..	2727
El Yakoubi, A. Nafidi, M. Braigue, R. Morghi, H. Chaib, J. Hemine, M. S. Vinod, T. El Gouti, and R. Suryanarayanan Correlation Between Enhanced T <sub>c</sub> , the Unit Cell Volume and AC Magnetic Shielding in Argon Preheated (Y <sub>1-x</sub> Eu <sub>x</sub> )(SrBa)Cu <sub>3</sub> O <sub>6+z</sub> .....	2732
El Yakoubi, A. Nafidi, R. Morghi, M. Braigue, H. Chaib, J. Hemine, M. S. Vinod, M. Massaq, and R. Suryanarayanan Aging Effect in Differently Coated BaZrO <sub>3</sub> -Doped GdBaCuO Thin Films Deposited From a Nanograined Target .....	2737
Magnetic Orientation of Superconductors With Layered Crystal Structures .....	2741
Cation Nonstoichiometry in Y123 Sintered Bulks and Thin Films .....	2745
Flux Pinning Properties in YBCO Thin Films With Self-Aligned Magnetic Nanoparticles .....	2749
Optimal BZO Doping in YBCO Films Grown on Single Crystal STO and Buffered NiW Substrates .....	2753
Correlation Between Flux Pinning Properties and Interfacial Defects in YBa <sub>2</sub> Cu <sub>3</sub> O <sub>7-8</sub> /CeO <sub>2</sub> Multilayer Thin Films ..	2758
Optimization of the BaCeO <sub>3</sub> Concentration in YBCO Films Prepared by Pulsed Laser Deposition .....	2762

Fabrication of High-Quality Epitaxial YBCO Films Prepared by Fluorine-Free MOD .....	J.-W. Lee, Y.-S. Joo, S.-H. Moon, and S.-I. Yoo	2767
MOMBE Growth of $\text{YBa}_2\text{Cu}_3\text{O}_7$ Thin Films With c-Axis, a-Axis and (103/110) Orientations on $\text{SrTiO}_3$ Substrate ...	K. Endo, P. Badica, G. Uehara, and H. Kado	2771
Preparation of Y123 Thick Films by Fluorine-Free MOD Using a Novel Solution .....	I. Yamaguchi, W. Kondo, T. Hikata, K. Kamiya, H. Matsui, M. Sohma, K. Tsukada, Y. Nakagawa, T. Kumagai, and T. Manabe	2775
<b>Bi-2212 and Bi-2223 Wires and Tapes</b>		
Progress in Reducing AC Losses of Bi2223 Tapes with Interfilamentary Resistive Barriers .....	R. Inada, Y. Okumura, A. Oota, C. Li, and P. Zhang	2779
Texturing of Micaceous Superconductor Powder and Fabrication of Wire to Preserve the Texture .....	K. Damborsky, F. Lu, P. McIntyre, and N. Pogue	2783
Numerical Investigation of the Quench Behavior of $\text{Bi}_2\text{Sr}_2\text{CaCu}_2\text{O}_x$ Wire .....	D. Arbelaez, S. O. Prestemon, D. R. Dietderich, A. Godeke, L. Ye, F. Hunte, and J. Schwartz	2787
Analysis of High $I_c$ and $J_c$ Bi-2212 Conductors With Dilute Second Phase Additions .....	T. G. Holesinger, H. Miao, M. Meinesz, Y. Huang, J. Parrell, J. A. Kennison, K. R. Marken, and S. Campbell	2791
Effect of Solidification Conditions on Partial Melt Processed Bi2212/Ag Round Wire .....	W. T. Nachtrab, X. T. Liu, T. Wong, and J. Schwartz	2795
Microstructure and Critical Current Properties of Bi-2212 Round Wires Fabricated With Different Nominal Compositions .....	A. Matsumoto, H. Kitaguchi, H. Kumakura, Y. Hikichi, T. Nakatsu, and T. Hasegawa	2800
Transport, Magnetic, and SEM Characterization of a Novel Design Bi-2212 Strand .....	C. S. Myers, M. A. Susner, L. Motowidlo, J. Distin, M. D. Sumption, and E. W. Collings	2804
Study of Effects of Transverse Deformation in BSCCO-2212 Wires .....	E. Barzi, V. Lombardo, A. Tollesstrup, and D. Turrioni	2808
Synthesis of High Purity Bi(Pb)2223 Tapes With High $T_c$ Above 115 K .....	M. Watanabe, J. Shimoyama, K. Obata, K. Kishio, S. Kobayashi, and K. Hayashi	2812
Longitudinal Uniformity of Commercial Bi2223 Tapes Characterized by Scanning Hall-Probe Microscopy .....	R. Inada, S. Baba, R. Ohtsu, T. Makihara, S. Sakamoto, and A. Oota	2816
Evaluation of Self-Field Distributions for Bi2223 Tapes With Oxide Barriers Carrying DC Transport Current .....	T. Makihara, R. Inada, A. Oota, S. Sakamoto, C. Li, and P. Zhang	2820
The Construction Progress of a High-Tc Superconducting Power Substation in China .....	G. Zhang, S. Dai, N. Song, Z. Zhu, J. Zhang, W. Guo, D. Zhang, Z. Zhang, L. Xiao, and L. Lin	2824
Anisotropic Thermal Conductivity of Silver Sheathed Bi2223 Superconducting Tape .....	T. Naito, H. Fujishiro, and J. Fujikami	2828
Study on the High Temperature Pressure Charging Procedure of Bi-2223/Ag Superconducting Tapes .....	T.-M. Qu, C. Gu, K.-T. Huang, X.-H. Song, P. Zeng, and Z. Han	2832
Fabrication of Bi-2212 Coatings Using Thermospraying .....	J. M. Andrés, M. C. Mayoral, and L. A. Angurel	2836
Angular, Temperature, and Strain Dependencies of the Critical Current of DI-BSCCO Tapes in High Magnetic Fields .....	P. Sunwong, J. S. Higgins, and D. P. Hampshire	2840
<b>Pnictides</b>		
Low Porosity FeSe Preferred Orientation Crystal Growth by Bridgman Method .....	C.-M. Yang, P.-W. Chen, J.-C. Kou, P. Diko, I.-G. Chen, and M.-K. Wu	2845
$\text{Nd}_{1-x}\text{Fe}_x\text{OF}$ Thin Films Deposited by Chemical Vapor Deposition and Their Arsenic Diffusion .....	I. Corrales-Mendoza, A. Conde-Gallardo, and V. M. Sánchez-Reséndiz	2849
Effects of Heat Treatments on the Properties of $\text{SmFeAsO}_{1-x}\text{F}_x$ Oxypnictide Bulks Prepared via a Single-Step Route .....	M. Majoros, M. Kanuchova, M. A. Susner, M. D. Sumption, C. S. Myers, S. D. Bohnenstiel, and E. W. Collings	2853
Transport Properties of Iron-Based $\text{FeTe}_{0.5}\text{Se}_{0.5}$ Superconducting Wire .....	T. Ozaki, K. Deguchi, Y. Mizuguchi, H. Kumakura, and Y. Takano	2858
Estimation of Critical Current Densities in Polycrystalline $\text{Sr}_{0.6}\text{K}_{0.4}\text{Fe}_2\text{As}_2$ Superconductors .....	B. Ni, J. Ge, Y. Tanaka, E. Soji Otabe, M. Kiuchi, T. Matsushita, Z. Gao, L. Wang, Y. Qi, X. Zhang, and Y. Ma	2862
Single Crystal Growth and Structural Characterization of $\text{FeTe}_{1-x}\text{S}_x$ .....	Y. Mizuguchi, K. Deguchi, T. Ozaki, M. Nagao, S. Tsuda, T. Yamaguchi, and Y. Takano	2866
High Upper Critical Field in Potassium Fluoride Doped LaOFeAs Superconductor .....	S. J. Singh, J. Prakash, A. K. Ganguli, and S. Patnaik	2870
The Effect of Doping on the Magnetic Properties in $\text{Ba}(\text{Fe}_{1-x}\text{Co}_x)_2\text{As}_2$ Polycrystalline Samples .....	G. Celentano, G. De Marzi, S. Gaudio, A. Augieri, V. Galluzzi, A. Mancini, A. Rufoloni, A. Vannozi, A. della Corte, U. Gambardella, A. Saggesse, J. J. Jiang, J. Weiss, and E. Hellstrom	2874
Development of Powder-in-Tube Processed Iron Pnictide Wires and Tapes .....	Y. Ma, L. Wang, Y. Qi, Z. Gao, D. Wang, and X. Zhang	2878

Dependence of Epitaxial $\text{Ba}(\text{Fe}_{1-x}\text{Co}_x)_2\text{As}_2$ Thin Films Properties on $\text{SrTiO}_3$ Template Thickness .....	S. Lee, J. Jiang, J. D. Weiss, C. W. Bark, C. Tarantini, M. D. Biegalski, A. Polyanskii, Y. Zhang, C. T. Nelson, X. Q. Pan, E. E. Hellstrom, D. C. Larbalestier, and C. B. Eom	2882
$J_c$ Scaling and Anisotropies in Co-Doped Ba-122 Thin Films .....	J. Hänsch, K. Iida, S. Haindl, F. Kurth, A. Kauffmann, M. Kidszun, T. Thersleff, J. Freudenberg, L. Schultz, and B. Holzapfel	2887
<b>Coated Conductors</b>		
Oxidation Behavior at the Ni-W and $\text{CeO}_2$ Interface With and Without Pd Over Layer .....	A. Mancini, A. Vannozi, V. Galluzzi, A. Rufoloni, A. Augieri, A. A. Armenio, I. Colantoni, I. Davoli, and G. Celentano	2891
Characterization of the Seed Layer Modified $\text{La}_2\text{Zr}_2\text{O}_7$ Buffer Layer Coated on Cube Textured Ni5%W Substrate .....	Y. Cheng, H. Suo, M. Gao, M. Liu, and L. Ma	2896
Surface Decoration Combined With Second Phase of $\text{BaTiO}_3$ for YBCO Film by Chemical Solution Deposition .....	D. Shi, Q. Li, L. Wang, X. Zhu, J.-G. Kim, T. Yamashita, and S. Cooper	2900
The Role of Nucleation Surfaces in the Texture Development of Magnesium Oxide During Ion Beam Assisted Deposition .....	J. R. Groves, V. Matias, R. F. DePaula, L. Stan, R. H. Hammond, and B. M. Clemens	2904
Study of MgO-Based Buffer Layer Architecture for the Development of Ni-Cu-Based RABiTS YBCO Coated Conductor .....	A. Vannozi, V. Galluzzi, A. Mancini, A. Rufoloni, A. Augieri, A. Angrisani Armenio, L. Ciontea, G. Thalmaier, T. Petrisor, and G. Celentano	2908
Preparation of a Novel $\text{Ce}_{0.9}\text{La}_{0.1}\text{O}_2/\text{Gd}_2\text{Zr}_2\text{O}_7$ Buffer Layer Stack on NiW Alloy Substrates by the MOD Route .....	Y. Zhao, J.-C. Grivel, A. B. Abrahamsen, D. Pavlopoulos, J. Bednarčík, and M. von Zimmermann	2912
MOCVD of YBCO and Oxide Buffer Layers on Textured Ni-Alloy Tapes ... R. Yu, Muydinov, O. Stadel, and G. Bräuer	R. Yu, Muydinov, O. Stadel, and G. Bräuer	2916
High- $J_c$ YBCO Coated Conductors Based on IBAD-TiN Using Stainless Steel Substrates .....	R. Gärtner, R. Hühne, J. Engelmann, J. Hänsch, R. Kaltofen, S. Oswald, L. Schultz, and B. Holzapfel	2920
Influence of Buffer Layer Surface Morphology on YBCO Critical Current Density Deposited on NiW Tapes .....	Y. Li, L. Liu, H. Liu, X. Sun, D. Hong, D. Xu, and Y. Wang	2924
Development of All-CSD Processes for Coated Conductors at Nexans: Limitations and Possible Solutions .....	M. O. Rikel, J. Ehrenberg, S. Mahachi, M. Klein, B. Hoppe, J. Schütz, and J. Bock	2928
Thickness Dependence of the Critical-Current Density and its Relation to Near-Interface Crystal Imperfections in Fluorine-Free-MOD YBCO Films .....	H. Matsui, K. Tsukada, T. Tsuchiya, M. Sohma, I. Yamaguchi, T. Manabe, and T. Kumagai	2933
Deposition of YBCO Thin Film by Aerosol Assisted Spray Pyrolysis Using Nitrates .....	B.-J. Kim, S.-K. Hong, J.-G. Kim, J.-H. Kim, S. X. Dou, L. Dunlop, A. Kursumovic, J. L. MacManus-Driscoll, H.-G. Lee, and G.-W. Hong	2937
Fabrication of $\text{Gd}_1\text{Ba}_2\text{Cu}_3\text{O}_x$ Coated Conductors for HTS Cables .....	K. Abiru, Y. Shingai, M. Konishi, and K. Ohmatsu	2941
Thickness Effect on the Structural and Electrical Properties of Sputtered YBCO Coated Conductors .....	B. Tao, N. Zhang, F. Zhang, Y. Xia, X. Feng, Y. Xue, X. Zhao, J. Xiong, and Y. Li	2945
Possibility of Nd:YAG-PLD Method for Fabricating REBCO Coated Conductors .....	Y. Ichino, Y. Yoshida, T. Yoshimura, I. Ono, Y. Takai, M. Yoshizumi, T. Izumi, and Y. Shiohara	2949
Pushing Coated Conductor Critical Currents Beyond 1 kA per cm Width: Stacks of YBCO Layers .....	Y. Jung, C. J. Sheehan, J. Y. Coulter, V. Matias, and D. Youm	2953
The Magnetic Properties of SmBCO Coated Conductors Fabricated by Evaporation Using Drum in Dual Chamber (EDDC) Processing ... K. J. Song, S. Kang, R. K. Ko, H. S. Kim, H. S. Ha, S. S. Oh, S. H. Moon, S. I. Yoo, and C. Park	K. J. Song, S. Kang, R. K. Ko, H. S. Kim, H. S. Ha, S. S. Oh, S. H. Moon, S. I. Yoo, and C. Park	2957
Full Vector Magnetic Field Critical Current Characterization of Coated Conductors Deposited on Solution Deposition Planarized IBAD Templates .....	D. Reagor, J. Y. Coulter, V. Matias, C. J. Sheehan, and B. Moeckly	2961
High $J_c$ $\text{GdBa}_2\text{Cu}_3\text{O}_{7-\delta}$ Coated Conductors on $\text{CeO}_2$ -Buffered IBAD MgO Template Fabricated by Pulsed Laser Deposition .....	K.-P. Ko, S.-H. Moon, C. Park, and S.-I. Yoo	2965
Fabrication of the Textured Ni-9.3at.%W Alloy Substrate for Coated Conductors .....	M. M. Gao, H. L. Suo, J.-C. Grivel, Y. Zhao, P. K. Gao, M. Liu, and L. Ma	2969
Fabrication of a Textured Non-Magnetic Ni-12at.%V Alloy Substrate for Coated Conductors .....	M. M. Gao, J.-C. Grivel, H. L. Suo, Y. Zhao, D. He, and N. H. Andersen	2973
LZO, a Protective Barrier Against Oxidation of NiW Alloys .....	S. Petit, M. Mikolajczyk, J.-L. Soubeyroux, T. Waeckerlé, R. Battonnet, S. Pairis, and P. Odier	2977
Solution Derived $\text{Sm}_2\text{O}_3$ Films on Biaxially Textured Ni-W Substrates .....	L. Wang, D. Shi, Q. Li, and X. Zhu	2981
Reel-to-Reel Copper Electroplating on Pulse Laser Deposition Coated Conductor .....	U. Floegel-Delor, T. Riedel, D. Wippich, B. Goebel, R. Rothfeld, P. Schirrmeyer, F. N. Werfel, A. Usoskin, and A. Rutt	2984
n-Value Analysis of Position-Dependent Property Variability in Long-Length Coated Conductors .....	J. O. Willis, J. Y. Coulter, and M. W. Rupich	2988
Experimental Analysis of Unequal Voltage Distribution on a Single YBCO Coated Conductor Affected by Inhomogeneous Critical Currents in Liquid Nitrogen and Sub-Cooled Liquid Nitrogen .....	S. Y. Chu, J. Y. Jang, S. Choi, Y. J. Kim, K. S. Chang, and T. K. Ko	2992

Electro-Mechanical Property Investigation of Striated REBCO Coated Conductor Tapes in Pure Torsion Mode .....	2997
A Research About Bending Strain Effect on Splice Characteristics in $\text{YBa}_2\text{Cu}_3\text{O}_{7-x}$ Coated Conductors Under Various Pressures in Splicing .....	3001
An Experimental Study on the Joint Methods Between Double Pancake Coils Using YBCO Coated Conductors .....	3005
Lap Joint Resistance of YBCO Coated Conductors .....	3009
A Structure Design of HTS Current Leads With Respect to the Structure of Coated Conductor and the Current Terminal ..	3013
Changes in the Thermal Stability of 2G HTS Wires by Local Modification of the Stabilization Layer .....	3017
Coated Conductor Rutherford Cables (CCRC)for High-Current Applications: Concept and Properties .....	3021
Degradation of YBCO Coated Conductors Due to an Over-Current Pulse .....	3025
Over-Current Characteristics Influenced by Ag Stabilizer Thickness in a GdBCO Coated Conductor (CC) .....	3029
Current Margin Against the Fault Current in REBCO Coated Conductors .....	3033
Thermal Conductivity of YBCO Coated Conductors Reinforced by Metal Tape .....	3037
Numerical and Experimental Analysis of Normal Zone Propagation on 2G HTS Wires .....	3041
Investigation of the Stability Behavior of Coated Conductors .....	3045
Progress in Performance Improvement and New Research Areas for Cost Reduction of 2G HTS Wires .....	3049
Scale Up of Coated Conductor Substrate Process by Reel-to-Reel Planarization of Amorphous Oxide Layers .....	3055
Development of Solution Buffer Layers for RABiTS Based YBCO Coated Conductors .....	3059
Quench Characteristics of a Cu-Stabilized 2G HTS Conductor .....	3062
<b>HTS Thin Films and Multilayers</b>	
Control of Orientation of $\text{RBa}_2\text{Cu}_3\text{O}_7$ Films on Substrates With Low Lattice Mismatch Via Seed Layer Formation .....	3066
Optimization of the TFA-MOD Process for Introduction of $\text{BaZrO}_3$ Pinning Centers in YBCO Films .....	3070
TE and TM-Polarized Nonlinear Guided Waves in Planar Superlattice Transmission Lines .....	3075
Stimulation of Superconductivity in Submolecular Structures With Weakly Coupled Superconducting Layers .....	3079
Differential Conductance Measurements of $\text{MgB}_2$ -Based Josephson Junctions Below 1 Kelvin .....	3083
<b>HTS Mechanical Properties</b>	
Electromechanical Characterization of Bi-2212 Strands .....	3086
Internal Strain Behavior Exerted on YBCO Layer in the YBCO Coated Conductor .....	3090
Hoop Stress Test of $\text{GdBa}_2\text{Cu}_3\text{O}_y$ Coated Conductor .....	3094
Influence of Shear Stress on Current Carrying Capabilities of High Temperature Superconductor Tapes .....	3098
Finite Element Analysis of Torsion Experiments on HTSC Tapes .....	3102
Mechanical Properties of Dy123 Low Porosity Bulk Superconductors at Liquid Nitrogen Temperature .....	3107
Experimental Study of Twisting First Generation BSCCO Tapes .....	3111

Transport Property and Temperature Dependence of $I_c$ in REBCO Coated Conductor Tapes by Pumping and Pressurization of $\text{LN}_2$ .....	3115
Mechanical Properties of Non-Superconducting Components in YBCO and $\text{Nb}_3\text{Sn}$ Composites .....	3119
Electrical and Mechanical Characterizations of Nanocomposite Insulation for HTS Systems .....	3123
Design and Testing of ITER TF Coil Insulations .....	3127
<b>Flux Pinning and Dynamics</b>	
Test Results of a NbTi Wire for the ITER Poloidal Field Magnets: A Validation of the 2-Pinning Components Model ...	3132
Characterization of the Low Temperature Superconductor Niobium Carbonitride .....	3138
AC Susceptibility Studies of Anisotropy in Sm-123 Superconductors .....	3142
Local Magnetic Investigations of $\text{MgB}_2$ Bulk Samples for Magnetic Shielding Applications .....	3146
Optimization of Heat Treatment Profiles Applied to Nanometric-Scale $\text{Nb}_3\text{Sn}$ Wires With Cu-Sn Artificial Pinning Centers .....	3150
Transport Characterization of $\text{GdBa}_2\text{Cu}_3\text{O}_{7-\delta}$ Coated Conductors Deposited by the In-Plume PLD Reel-to-Reel Technique .....	3154
Strong Flux Pinning by Magnetic Interlayers Compatible With $\text{YBa}_2\text{Cu}_3\text{O}_{7-\delta}$ .....	3159
Characterization of Commercial YBCO Coated Conductors After Neutron Irradiation .....	3162
Composition Effects on the Critical Current of MOCVD-Processed Zr:GdYBCO Coated Conductors in an Applied Magnetic Field .....	3166
Pinning Enhancements in YBCO Films via Nanoengineered $\text{LaMnO}_3:\text{MgO}$ Composite Cap Layer .....	3171
All-MOCVD Technology for Coated Conductor Fabrication .....	3175
Origin of Surface Morphology Variation During Pulsed Laser Deposition of $\text{YBa}_2\text{Cu}_3\text{O}_7$ Superconducting Films .....	3179
Synergetic Pinning Centers in $\text{YBa}_2\text{Cu}_3\text{O}_x$ Films Through a Combination of Ag Nano-Dot Substrate Decoration, Ag/YBCO Quasi-Multilayers, and the Use of $\text{BaZrO}_3$ -Doped Target .....	3184
Vortex Dynamics in Nanostructured TFA-Grown YBCO Films Studied by Ac Susceptibility .....	3189
Cooperative Behavior of the Random and Correlated Pinning in Er123 Films With Columnar Defects .....	3192
Study of Matching Fields in Kagomé Patterned YBCO Thin Films ....	3196
Effect of Neutron Irradiation on High-Temperature Superconductors .....	3200
In-Field Current Transport Properties of 600 A-Class $\text{GdBa}_2\text{Cu}_3\text{O}_{7-\delta}$ Coated Conductor Utilizing IBAD Template ...	3206
Field Angle Dependence of Critical Current Density in YGdBCO Coated Conductor .....	3210
Low-Temperature Pinning Behavior of MOD YBCO Coated Conductors .....	3214
Effect of Oxygen Depletion on the Pinning Properties of $\text{YBa}_2\text{Cu}_3\text{O}_x$ Films With Nanoinclusions .....	3218
Numerical Investigations on Edge Effects of Shielding Current Density in HTS Thick Film .....	3222
The $I_c$ Behavior of 2G YBCO Tapes Under DC/AC Magnetic Fields at Various Temperatures .....	3226
Electrical Characteristics of Stacks of YBCO Tapes in Applied Magnetic Field .....	3230
Critical Current Density of $\text{YBa}_2\text{Cu}_3\text{O}_{7-\delta}$ Coated Conductors Under High Compression in High Fields .....	3234

Investigation of Dynamic Behaviors of Low-Level Dissipation at $\text{YBa}_2\text{Cu}_3\text{O}_7$ Grain Boundaries Using Low-Temperature Near-Field Scanning Microwave Microscopy .....	3238
Pinning Landscape Analysis in YBCO Films With Epitaxial and/or Non-Coherent BZO Nanoparticles .....	3243
Critical Currents of $\text{YBa}_2\text{Cu}_3\text{O}_{7-\delta}$ Tapes and $\text{Bi}_2\text{Sr}_2\text{CaCu}_2\text{O}_x$ Wires at Different Temperatures and Magnetic Fields ..	3247
<b>AC Losses</b>	
Dynamic Resistance of YBCO-Coated Conductors in Applied AC Fields With DC Transport Currents and DC Background Fields .....	3251
AC Magnetization Losses in Copper-Stabilized YBCO Coated Conductors Subjected to Repeated Mechanical Stresses ..	3257
Innovative Calorimetric AC Loss Measurement of HTSC for Power Applications .....	3261
Modeling and Electrical Measurement of Transport AC Loss in HTS-Based Superconducting Coils for Electric Machines .....	3265
Transport AC Loss Measurements in Superconducting Coils .....	3269
Towards Faster FEM Simulation of Thin Film Superconductors: A Multiscale Approach ....	3273
Study of YBCO Tape Non-Uniformity Based on the AC Loss and the Magnetic Field Distribution in Current Transport ..	3277
$\text{YBa}_2\text{Cu}_3\text{O}_{7-\delta}$ Films Grown on Faceted Sapphire Fiber ....	3281
Experimental Evaluation of the Effect on AC Loss of a Polygonal Arrangement in YBCO Assembled Conductors .....	3285
Transport AC Loss Characteristics of a Five Strand YBCO Roebel Cable With Magnetic Substrate .....	3289
AC Magnetization Loss of a YBCO Coated Conductor Measured Using Three Different Techniques .....	3293
AC Loss Filamentization of 2G HTS Tapes by Buffer Stack Removal .....	3297
AC Loss Reduction in Filamentized YBCO Coated Conductors With Virtual Transverse Cross-Cuts .....	3301
AC Transport Loss of Coated Conductors in Anti-Parallel Arrangement .....	3307
Magnetic and Transport AC Losses in HTS Roebel Cable .....	3311
Influence of Repeated Mechanical Stresses on AC Losses in Multi-Filamentary Bi2223/Ag-Sheathed Wires .....	3316
Study on Method to Suppress Decay of Trapped Magnetic Fluxes in the HTS Bulk Subjected to Perturbation of External Magnetic Field by Use of Shielding Coil Wound of HTS Wire .....	3320
Influence of DC Offset Transport Current on AC Loss Characteristics in HTS Tapes .....	3325
The Effect of Operating Temperature on Transport AC Loss According to an YBCO Superconducting Tape Array Geometry .....	3329
Low Loss Nb-Ti Superconducting Rutherford Cable Manufacture for the SIS300 INFN Model Dipole .....	3334
Magnesium Diboride Wires With Nonmagnetic Matrices—AC Loss Measurements and Numerical Calculations .....	3338
AC Loss in $\text{MgB}_2$ Superconducting Wires at Various Operating Temperatures .....	3342

<b>Conductor Measurement</b>	
Critical Current Densities of MOCVD Tapes for Different Current Directions .....	3347
Characterization of Co-Evaporated $\text{SmBa}_2\text{Cu}_3\text{O}_7$ Coated Conductors by Polarized-Raman Scattering Spectroscopy ...	3352
Performance of Trapped Magnetic Field in Superconducting Bulk Magnets Activated by Pulsed Field Magnetization ...	3356
Numerical Investigation of Inductive and Permanent-Magnet Methods to Measure Critical Current Density of HTS Thin Films .....	3360
High-Performance Simulation of Shielding Current Density in HTS by Constitutive-Relation Relaxation Method .....	3364
Measurement of the Transverse Resistivity of NbTi and Internal-Tin $\text{Nb}_3\text{Sn}$ Strands .....	3369
Magnetization and Inter-Filament Contact in HEP and ITER Bronze-Route $\text{Nb}_3\text{Sn}$ Wires .....	3373
Development of a Compact Measurement System of Transport Characteristics in HTS Conductors by Using an HTS Current .....	3377
Non-Destructive Testing of Each Layer in GdBCO IBAD-PLD Coated Conductor by Using a High-Speed Scanning Laser Observation System .....	3381
Detection of Critical Current Distribution of YBCO-Coated Conductors Using Permanent Magnet Method .....	3385
Current and Field Distribution in Meandered Coated Conductors for Roebel Cables .....	3389
Local Investigation of Spatial Homogeneity in 600 A/cm-w Class $\text{GdBa}_2\text{Cu}_3\text{O}_{7-\delta}$ PLD Coated Conductor .....	3393
Electrical and Magnetic Characterization of BSCCO and YBCO HTS Tapes for Fault Current Limiter Application .....	3398
Investigation of Three-Dimensional Current Distribution at Silver Diffusion Joint of RE-123 Coated Conductors Based on Magnetic Microscopy Combined With Finite Element Method .....	3403
Computation of Current Distribution in YBCO Tapes With Defects Obtained From Hall Magnetic Mapping by Inverse Problem Solution .....	3408
Method and Apparatus for Continuous $I_c$ Examination of HTS Tape Using Magnetic Circuit .....	3413
Investigation of Power Dissipation Mechanisms in Coated Conductors at High Current Densities Based on Ultra-Fast Pulsed Current Measurements .....	3417
Current Limiting Phenomena in $\text{SmBa}_2\text{Cu}_3\text{O}_7$ Coated Conductors Observed by Laser-Induced Thermoelectric Imaging and Low-Temperature Laser Scanning Microscopy .....	3421
<b>CONFERENCE AUTHOR INDEX</b> .....	