In this contribution, however, we provide for the first time a systematic study of the electronic and magnetic properties of mixed WO_3 and ReO_3 phases. [1] See for example: M. Figlarz, Chemica Scripta 28, 3, (1988) [2] A. W. Sleight, J. L. Gillson, Sol. St. Comm. 4, 601, (1966) [3] O. Bock, U. Müller, Z. Anorg. Allg. Chem. 628, 987, (2000)

TT 23.9 Mo 14:00 Poster TU D

$La_2Zr_2O_7$ buffer layers on Ni RABiTS for YBCO coated conductors using chemical solution deposition — •Kerstin Knoth, Sebastian Engel, Ruben Hühne, Heike Schlörb, Ludwig Schultz, and Bernhard Holzapfel — IFW Dresden, Helmholtzstrasse 20, 01069 Dresden

Chemical Solution Deposition (CSD), as a low-cost method for producing YBCO coated conductors, has been used to prepare $La_2Zr_2O_7$(LZO) buffer layers on Ni RABiTS. The LZO precursor solution was prepared by dissolving La-, and Zr-2.4-pentanedionates in propionic acid. Solutions with different concentrations as well as variable dip coating speeds were examined to obtain thick and crack free LZO layers on Ni substrates (10 mm x 10mm). During the heat treatment at temperatures around 900°C in a reducing atmosphere, highly textured LZO buffer layers were grown. The texture quality was determined using X-Ray Diffraction (XRD) and Reflection High Energy Electron Diffraction (RHEED). The LZO buffer layers show a strong c-axis orientation in $\theta - 2\theta$ scans and a very good in-plane alignment on Ni, with FWHM values of 6.9° (Ni: 6.0°) and 7.2° (Ni:6.0°) for the in-plane and out-of-plane orientations. Further analyses by SEM and Atomic Force Microscopy (AFM) show dense and crack free layers. The LZO solution was also applied to long lengths using a reel-to-reel dip coating and drying unit. XRD analyses of first longer samples show good c-axis orientation. AFM and SEM investigations are in progress.

TT 23.10 Mo 14:00 Poster TU D

Preparation of buffer layer architectures based on surface oxidized Ni tapes for coated conductor applications — •R. Hühne, D. Selbmann, J. Eickemeyer, L. Schultz, and B. Holzapfel — IFW Dresden, Germany

The preparation of cube textured NiO buffer layers on biaxially textured Ni tapes (RABiTS) using surface oxidation epitaxy (SOE) offers a cheap and scalable route for the production of long-length YBCO coated conductors. Therefore, thin highly textured NiO layers have been grown on different microalloyed Ni-tapes. A second buffer layer is necessary to ensure epitaxial growth of the YBCO as well as to prevent Ni contamination of the superconducting layer. Different perovskite buffer were successfully grown on SOE-NiO using pulsed laser deposition (PLD). Among them, $BaZrO_3$ and $SrZrO_3$ buffers show a high quality epitaxial growth on NiO with an in-plane orientation similar to the underlying NiO. The subsequent deposition of YBCO on top of these buffers requires a thin intermediate $SrTiO_3$ layer resulted in epitaxial layers with a T_c above 87 K and J_c up to 1.6 MA/cm^{-2}. Microstructural investigations showed that the surface topography of the buffer layers and the YBCO is mainly determined by the quality of the NiO layer.

TT 23.11 Mo 14:00 Poster TU D

Optimization of thick $YBa_2Cu_3O_{7-x}$ coated conductors produced by the TFA process — •Thomas Thersleff, Martina Falter, Heike Schlörb, Ludwig Schultz, and Bernhard Holzapfel — IFW Dresden, Helmholzstr. 20, 01069 Dresden

In this study, the effect of layer thickness, furnace ramp rate, and peak reaction temperature on YBCO layers chemically deposited onto single-crystal STO using the TFA process is assessed. First, layer thickness was increased by coating substrates multiple times. After each coating, the substrates were pyrolized up to 400°C in a humid flowing gas O_2 furnace. A single coating with our standard TFA precursor produces a layer $\sim$ 200 nm thick. Second, single layers were subjected to a slow heating ramp rate of 150 K/h in the 400-750°C region. Third, other single layer samples were reacted at a depressed peak temperature of 760°C to avoid reaction at the film boundary. Results show that substrates coated up to three times retain superconductivity with a ΔT_c of 3.9 K. XRD indicates the presence of BaF_2, suggesting further temperature refinement is necessary. The slower ramp rate for single layers results in superior current transport properties, with J_c as high as 5 MA/cm^2. Samples reacted at 760°C maintain superconductivity with a ΔT_c as low as 1.4 K.

TT 23.12 Mo 14:00 Poster TU D

$YBa_2Cu_3O_{7-x}$-Schichten und Schichtsysteme für supraleitende Bauelemente — •Ulrike Baldeweg, Pierre Lorenz, Susan Biering, Veit Grosse, Christoph Becker, Ralf Bechstein, Tobias Förster, Hagen Wald, Frank Schmidl und Paul Seidel — Institut für Festkörperphysik, Friedrich-Schiller-Universität Jena, Helmholtzweg 5, 07743 Jena

Es werden Ergebnisse zur LASER-gestützten, großflächigen Abscheidung von supraleitenden $YBa_2Cu_3O_{7-x}$(YBCO)-Schichten vorgestellt. Verschiedene Technologien zur Mikrostrukturierung und Passivierung werden hinsichtlich der elektrischen Eigenschaften der Proben und ihrer Stabilität verglichen. Mögliche Einsatzgebiete dieser Schichten sind Antennenstrukturen für Magnetometer und Gradiometer.

TT 23.13 Mo 14:00 Poster TU D

Optimierung von HTSC FlipChip-Gradiometern mit SiO_2 als Isolationsmaterial — •Susan Biering, Ulrike Baldeweg, Ralf Bechstein, Christoph Becker, Veit Grosse, Frank Schmidl und Paul Seidel — Institut für Festkörperphysik, Physikalisch-Astronomische Fakultät, Friedrich-Schiller-Universität Jena, Helmholtzweg 5, 07743 Jena

Es wurden Untersuchungen zur Optimierung gradiometrischer Sensoren mit einer auf einem separaten Substrat befindlichen Antenne, welche in einer FlipChip-Konfiguration mit dem Gradiometer verbunden ist, durchgeführt. Dabei wurden zur Realisierung der Josephson-Kontakte $YBa_2Cu_3O_7$-Schichten auf $SrTiO_3$-Bikristallen eingesetzt. Um langzeitstabile, gegenüber äußeren Einwirkungen unempfindliche Sensoren herstellen zu können, ist ein Isolationsmaterial erforderlich, das zudem eine sehr niederohmige Ankontaktierung ermöglicht. In den Mittelpunkt des Interesses ist dabei das Material SiO_2 gerückt. Erste Erfahrungen mit diesem Material werden vorgestellt.

TT 23.14 Mo 14:00 Poster TU D

Elektrische Eigenschaften von $SrTiO_3$ als Isolationsschicht für Tieftemperaturanwendungen — •Veit Grosse, Hagen Wald, Michael Mans, Frank Schmidl und Paul Seidel — Institut für Festkörperphysik, Physikalisch-Astronomische Fakultät, Friedrich-Schiller-Universität Jena, Helmholtzweg 5, 07743 Jena

Mittels Laserdeposition auf dünnen YBCO-Schichten abgeschiedenes $SrTiO_3$ wurde hinsichtlich seiner elektrischen Eigenschaften und Eignung als Isolationsschicht für supraleitende Bauelemente untersucht. Neben dem erwarteten Verhalten als Schottky-Kontakt, zeigten sich auch Widerstandsänderungen, die zu einem hysteretischen Verlauf der I-U-Kennlinien führten. Es werden Erklärungsversuche für diesen Effekt präsentiert. Des weiteren wird näher auf die dielektrischen Eigenschaften des $SrTiO_3$ bei tiefen Temperaturen, sowie die supraleitenden Eigenschaften der YBCO-Schichten in einem YBCO-STO-YBCO-System eingegangen.

TT 23.15 Mo 14:00 Poster TU D

Reversible and irreversible magnetostrictive effects in untwinned $YBa_2Cu_3O_7$ crystals — •P. Popovich[1], R. Lortz[1,2,3], C. Meingast[1], S. Tajima[4], and T. Masui[4] — [1]Forschungszentrum Karlsruhe, IFP, Germany — [2]Fakultät für Physik, Universität Karlsruhe, Germany — [3]present address: DCMP, University of Geneva, Switzerland — [4]ISTEC, Tokyo, Japan

The magnetostriction coefficients, $\lambda_i = 1/L_i \cdot dL_i/dH$ (i=a,b,c), of high-pressure oxygenated untwinned $YBa_2Cu_3O_7$ single crystals are determined between 40 K and 150 K and in fields up to 10 T. Above 55K, λ is nearly reversible and is, thus, proportional to the uniaxial pressure dependence of the magnetization, which in turn provides important information about the pressure dependencies of T_c(H), the vortex melting transition T_m(H), the thermodynamical critical field H_c(T=0), κ, and the normal state susceptibility. Clear signatures in λ(H) are seen at T_m(H) and at the broadened H_{c2}. Both transitions exhibit good 3D-XY scaling, which clearly demonstrate the importance of thermal phase fluctuations. The driving force for most of the reversible magnetostriction is due to dT_c/dp_i. Below 55K and above 6-8T, λ(H) becomes irreversible due to increased flux pinning at the order-disorder Bose-glass to vortex-glass transition. In contrast to the magnetization, which shows the typical monotonic peak effect, the irreversible magnetostriction exhibits reproducible fine structure within the transition region. This may be due to nucleation of distinct vortex domains in the crystal, which would provide clear evidence for a first-order transition.