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NOTA BENE: Cube Texture

One of the methods showing promise for the fabrication of long $YBa_2Cu_3O_{7-\delta}$ tapes on metallic substrates such as *Ni* involves RABiTS (rolling-assisted biaxially textured substrates). A preprint by E. D. Specht et al. (Oak Ridge) describes a number of details about how to make this process work. Rolling and annealing of fcc metals such as *Cu*, *Ag*, *Au*, *Al*, and *Ni* can lead to the so-called {100}<100> or cube texture, the first symbol indicating that one of the {100} planes is parallel to the rolled surface and the second symbol indicating that one of the <100> axes is oriented parallel to the rolling direction. In this paper, the authors report results in which high-purity (99.99%), randomly oriented *Ni* bars were successively rolled to thicknesses from 500 μm to 125 μm . Polished work rolls were used to produce a smooth *Ni* surface. The samples were annealed at temperatures from 200°C to 1375°C for 10 min in a mixture of 0.04 atm H_2 and 0.96 atm *Ar*. The sharpness of the resulting texture was measured using x-ray rocking curves and ϕ scans.

The authors found that for annealing temperatures between 200°C and 300°C, cube-textured grains nucleate with a 1 μm average grain size, and that between 300°C and 600°C, grain coarsening occurs until the average grain size reaches half the sample thickness. No evidence for secondary recrystallization was found, as the maximum grain size was always about twice the average. The authors found that annealing temperatures over a wide range (300-1375°C) lead to the development of cube texture in high-purity *Ni*. Higher temperatures lead to a sharper texture but produce a rougher surface. A thickness of 125 μm was found to produce the best texture. Additional work is needed to investigate the behavior at thicknesses below 125 μm . A combination of high reduction and high-temperature annealing in a reducing atmosphere was found to lead to >99% cube texture, with mosaic spreads of 5.0° about the normal direction, 9.0° about the rolling direction, and 6.5° about the transverse direction (perpendicular to the normal and rolling directions).

The fabrication of in-plane-aligned $YBa_2Cu_3O_{7-\delta}$ (*Y-123*) films on a *Ag*(100) single-crystalline substrate and a {100}[001] cubic textured silver tape by the liquid-phase-epitaxy (LPE) method is reported by Y. Niiori (SRL-ISTEC) et al. To improve the in-plane alignment of the *Y-123* film, a 500 nm *MgO* buffer layer was first deposited on the silver substrate by reactive pulsed laser deposition. The deposited *MgO* buffer layer showed good in-plane alignment, and the LPE-grown *Y-123* thick (about 1.0 μm) film on the buffer layer was highly c-axis-oriented and showed good epitaxial in-plane alignment. The authors explain the observed orientation by the near-coincident-site-lattices (NCSL) model.

$RBa_2Cu_3O_{7-\delta}$

As reported by R. A. Doyle (Cambridge) et al., artificial bulk zero-angle grain boundaries parallel to the c axis have been engineered between large melt-processed $YBa_2Cu_3O_{7-\delta}$ grains and observed to carry a transport supercurrent at fields up to at least 5 T at 77 K. The temperature and angular dependencies of the boundary resistance have exactly the same form as those of the grains, which is evidence that the grains are intimately coupled. The current transfer across the grain boundary is thus not that of a weak link or a weak Josephson junction.

A related paper describing investigations by electrical resistivity, current-voltage characteristics, magnetic-moment measurements, and Hall-probe mapping techniques of natural high-angle and artificial low-angle grain boundaries parallel to the CuO_2 layers has been prepared by Ph. Vanderbemden (Liège and Cambridge) et al. The authors note that artificial boundaries engineered by joining two *YBCO* single domains display a remarkably weak magnetic-field dependence. The authors thus suggest that such boundaries have significant potential for applications in high fields at 77 K.

The influence of dislocations on pinning of vortices in melt-textured and ceramic $YBa_2Cu_3O_{7-\delta}$ has been studied by L. Richard (LMP) et al. The authors found from dc and ac magnetic measurements that plastic deformation of melt-textured samples decreases the activation energy for flux motion. The authors find that this effect is due to microcracks produced along the (001) planes during the deformation process.

A study of compounds formed when up to 1% UO_4 is added to $YBa_2Cu_3O_{7-\delta}$ before texturing has been carried out by R.-P. Sawh et al. (Houston). The authors found that during melt-texturing, U reacts chemically with $YBa_2Cu_3O_{7-\delta}$ to form deposits about 300 nm in diameter. The resulting pinning centers, composed of $(U_{0.6}Pt_{0.4})YBa_2O_6$, increase the critical current density J_C by about a factor of two and do not change either T_C or the creep rate.

The dissolution of $SrBa_2Cu_3O_{7-\delta}$ seed crystals during top-seeded melt-growth processing of $YBa_2Cu_3O_{7-\delta}$ has been observed by Y. A. Jee (KAERI) et al. at temperatures below the melting point of the seed material. The authors found the dissolution to be dependent on factors such as the seeding method (cold vs. hot seeding), the holding temperature, and the composition of the seed and compact.

As reported by T. Puig et al. (Barcelona), single-domain ceramics of $NdBa_2Cu_3O_{7-\delta}$ with high T_C (95 K) and high critical current density J_C have been prepared in air by directional solidification techniques. The authors report the effect of $Nd_4Ba_2Cu_2O_{10}$ and Nd_2BaO_4 additives on T_C and J_C .

The current densities J_C and volume pinning forces F_p over wide ranges of temperature ($5\text{ K} \leq T \leq 92\text{ K}$) and magnetic field ($0 \leq \mu_0 H_a \leq 9\text{ T}$) of different $NdBa_2Cu_3O_{7-\delta}$ samples are reported by M. R. Koblischka et al. (SRL-ISTEC). Good scaling of F_p versus $h = H_a/H_{irr}$ was found above 60 K. The authors present evidence that pinning by composition fluctuations, producing a scatter of T_C , is active in $NBCO$, and they conclude that this mechanism is responsible for the position of the fishtail peak at high h and for the large J_C 's at 77 K. The authors suggest that the ideal pinning mechanism for high- T_C materials operating at 77 K could involve T_C fluctuations over volumes $V_{pin} \geq \xi^2 d$ (ξ = coherence length, d = intervortex spacing), while the ideal pinning mechanism for operation at low temperatures would require normal inclusions.

Polarized Raman spectra of $Nd_{1+x}Ba_{2-x}Cu_3O_{7-\delta}$ ($-0.023 \leq x \leq 0.107$) and $Pr_{1+x}Ba_{2-x}Cu_3O_{7-\delta}$ ($0.01 \leq x \leq 0.15$) single crystals have been investigated by N. Watanabe et al. (SRL-ISTEC). The authors found frequency shifts of phonon modes involving $Cu(2)$; these shifts cannot be explained by the change in relevant bond lengths due to Nd or Pr substitution on the Ba site.

Crystals of $PrBa_2Cu_3O_{7-\delta}$ ($Pr-123$) have been grown by K. Oka (ETL) et al. using the traveling-solvent floating-zone (TSFZ) method. The resulting crystal boules were identified as $Pr-123$ using a precision camera, x-ray powder diffraction, and scanning electron microscopy x-ray energy dispersion spectroscopy (SEM-EDS). The authors found that some parts of a boule show superconductivity with various T_C 's up to 80 K after oxygen annealing, but other parts of the same boule do not superconduct at all. The annealed superconductive crystals had c-axis lattice constants slightly longer than those of nonsuperconductive crystals.

Bi Cuprates

Self-field ac power losses dissipated by a single-phase $Bi-2223$ cable conductor carrying 50 Hz current up to 2 kA (peak) have been obtained by S. Zannella (CISE and Edison) et al. by measuring the rate with which liquid nitrogen evaporates. The cable conductor, made of four helically wound layers of $Bi-2223$ tapes, had a total length of ~ 1.5 m. Since the resolution of the calorimetric method is ~ 10 mW and the onset for measurements is above 100 mW, only high- T_C specimens of moderate size can be tested. The ac losses were measured simultaneously using an electrical method over a wide range of currents. The authors compare results using the two methods and discuss reasons for discrepancies. While electrical methods have the advantage in simple conductor geometries, the calorimetric method has a significant advantage over electrical methods in complicated configurations such as a three-phase cable assembly, where electrical methods become extremely difficult to apply because of the complex configuration of the resulting magnetic fields.

A preprint by C. Beduz (Southampton) et al. reports results of a round-robin of self-field ac loss measurements on $Bi-2223$ tapes, performed under the Brite EuRam research program SACPA. Excellent agreement on loss data has been obtained by the four measurement partners.

The self-field ac loss of $Bi-2223/Ag$ tapes has been measured electrically by J. J. Rabbers (Twente) et al. in the presence of a dc or an ac magnetic field. The authors found that the effect of an external ac magnetic field on the self-field loss of a $Bi-2223$ tape is different from the effect of a dc magnetic field; the increase of the self-field loss is much larger than the effect arising from the decreased critical current due to the magnetic field.

A paper by L. Jiang (Hefei) et al. reports that doping by B_2O_3 has a beneficial effect on phase formation and superconductivity of $(Bi,Pb)_2Sr_2Ca_2Cu_3O_{10+\delta}$ silver-sheathed tapes. The authors suggest that the B_2O_3 accelerates growth of the $Bi-2223$ phase by increasing the amount of liquid phase present.

A combination of relaxation measurements and magnetic hysteresis loops at different ramp rates has been used by S. Anders (Chicago) et al. to explore the dynamical behavior of the second peak in the magnetization of $Bi_2Sr_2CaCu_2O_{8+\delta}$ (*Bi-2212*) crystals. The authors found that the second peak is absent in the short-time limit and that the Bean profile decays at different rates above and below the second peak.

Other Cuprates

The influence of *AgPd* and *Au* interfaces on the formation of $(Hg,Bi)Ba_2Ca_2Cu_3O_{8+\delta}$ [*(Hg,Bi)-1223*] has been investigated by K. M. Amm (Florida State) et al. The authors found that the interfaces have a positive influence on grain growth and alignment but have a detrimental effect on the purity of the superconducting phase because of the formation of amalgams.

Quenching experiments conducted to understand the sequence of reactions that occur during the synthesis of doped *Hg-1223*, $(Hg,A)Ba_2Ca_2Cu_3O_{8+\delta}$ ($A = Re, Bi,$ and Pb) have been carried out by P.V.P.S.S. Sastry and J. Schwartz (Florida State). The authors found that control of *Hg* pressure during the reaction is crucial for achieving phase purity, grain growth, and texture in the final products.

^{63}Cu and ^{17}O NMR measurements in the normal and superconducting states of $Tl_2Ba_2Ca_2Cu_3O_{10-\delta}$ (*Tl-2223*) with different δ have been carried out by Y. V. Piskunov (Ekaterinburg) et al. From the variations with doping of the valence contribution to the electric-field gradient at *Cu* sites, the authors were able to estimate both the hole numbers at *Cu* and *O* sites and the concentration of mobile hole carriers n_h in each of the inequivalent CuO_2 layers. In overdoped *Tl-2223*, the charge density in the middle CuO_2 plane is less than that in the other two CuO_2 planes, but this charge-density difference disappears in the underdoped regime.

The properties of four new cuprates, $RBa_4Cu_3O_{8.5+\delta}$ (*R-143*), where $R = Ho, Er, Tm,$ and Yb , are reported by Y. T. Zhu et al. (Los Alamos). SQUID measurements indicated that none of the compounds was superconductive above 5 K.

Vortices

A small-angle neutron-scattering study of the vortex lattice in a large untwinned single crystal of $YBa_2Cu_3O_{7-\delta}$ is presented in a preprint by S. T. Johnson (Birmingham) et al. In fields parallel to the *c* axis, diffraction spots were observed corresponding to four orientations of a hexagonal lattice, distorted by *a-b* anisotropy. From 1.5 K data at 0.51 T, the authors extracted the anisotropy ratio $\gamma_{ab} = \lambda_a/\lambda_b = 1.18(2)$.

Second-order diffraction also was observed, indicating a well-ordered vortex lattice. With the field at 33° to the *c* axis, the authors observed a field-dependent reorientation of the lattice around 3 T.

Measurements of the electrical resistance with currents parallel to the layers in *Mo/Si* artificial superlattices are reported by N. Ya. Fogel et al. (Kharkov). When a magnetic field was applied perpendicular to the current but parallel to the layers or slightly inclined, the authors observed reentrant phenomena, which the authors explain in terms of intrinsic pinning and vortex-lattice commensurability with the underlying layered structure. The locations of the zero-resistance regions correspond to stable vortex-lattice configurations or to transitions between two commensurate lattices.

Flux Penetration

A lattice model of superconducting vortices driven by repulsive interactions through a random pinning potential is introduced in a preprint by K. E. Bassler and M. Paczuski (Houston). The model describes the vortex system at the scale of λ or larger and discards the identification of individual vortices. The model self-organizes to a critical state, characterized by a constant flux-density gradient, where flux motion takes place in terms of avalanches spanning all length scales up to the system size. The authors determine scaling relations and four universal critical exponents for avalanche moments and durations.

A numerical method for calculating the field-free core, current distribution, and self-field ac losses for straight superconducting tapes of arbitrary cross section has been developed by T. Fukunaga (Gifu) et al. The authors begin by regarding the superconductor as a bundle of 50,000 fibers. When total current *I* is applied to the superconductor, the outermost fibers carry current at the critical current density J_C , while the innermost fibers carry no current. The authors use an iterative method to determine which fibers carry the current. The ac loss results for rectangular tapes of various aspect ratio fall between the well-known Norris results for thin strips and conductors with elliptical cross section.

A method for reconstructing critical current profiles from hysteretic ac loss measurements is proposed in a preprint by A. A. Kordyuk (Kyiv) et al. The authors applied the method to study degradation in a bulk melt-textured *YBCO* sample.

Measurements of magnetic hysteresis in a $YBa_2Cu_3O_{7-\delta}$ single crystal using ac magnetic permeability are reported by K. I. Kugel (SICP, Moscow) et al. The authors report results which they attribute to the Bean-Livingston surface barrier.

Studies of numerical solutions of the time-independent Ginzburg-Landau (GL) equations for thin, low- κ ($\kappa = 0.28$),

type-I superconducting disks are reported in papers by V. A. Schweigert et al. and by V. A. Schweigert and F. M. Peeters (Antwerp). The authors found a smooth transition from a multi-vortex superconducting state to a giant vortex state as the disk thickness and the magnetic field are increased. A related paper by P. S. Deo et al. (Antwerp) presents GL calculations for $\kappa = 0.28$ indicating that the Bean-Livingston barrier is responsible for magnetic hysteresis in type-I superconducting disks.

Thin Films

A preprint by W. N. Kang et al. (TCSUH) reports the fabrication of high-quality c-axis-oriented $HgBa_2Ca_2Cu_3O_{8+\delta}$ (*Hg-1223*) thin films from stable *Re*-doped $Ba_2Ca_2Cu_3O_x$ precursor powder by pulsed laser deposition followed by post-annealing without any special handling. As-grown films on (100) $SrTiO_3$ exhibited a zero-resistance transition at ~ 131 K with a narrow transition width $\Delta T \sim 1.5$ K after oxygen annealing at 340°C for 12 h. The critical current densities were found to be 1.1×10^7 A/cm² at 10 K and 1.2×10^5 A/cm² at 120 K in zero field. The x-ray diffraction pattern indicated highly c-axis-oriented thin films normal to the substrate plane containing a minor $HgBa_2CaCu_2O_{6+\delta}$ (*Hg-1212*) phase. A scanning electron microscopy analysis showed that the film consisted of well-connected plate-like crystals but revealed that *Ba-Cu-O_x* impurities were uniformly scattered across the film surface.

The effect of an applied magnetic field upon the zero-bias conductance peak (ZBCP) observed in the tunneling spectra of $YBa_2Cu_3O_{7-\delta}/Pb$ junctions is reported by A. Aprili et al. (Illinois-Urbana). The authors find that the field-induced splitting is hysteretic and depends upon the orientation of the applied field relative to the *ab* plane. Both the hysteresis and the anisotropy can be explained by assuming that the ZBCP is a surface-induced Andreev bound state of the d-wave order parameter.

A technique to study magnetic flux relaxation in thin films of high-temperature superconductors at times arbitrarily close to the establishment of the critical state is presented in a preprint by T. Puig (Barcelona) et al. Heating of the film surface by a high-power laser pulse causes a collapse of the critical-state profile and a consequent expulsion of magnetic flux along the heated surface. This creates an emf between two contacts, the time integral of which is related to the number of vortices expelled.

The elemental composition and depth profiles of superconducting $Tl_2Ba_2CaCu_2O_{8+\delta}$ (*Tl-2212*) films deposited on yttria-stabilized zirconia (YSZ) have been studied by J. C. Cheang-Wong (UNAM) et al. using Rutherford backscattering spectrometry (RBS). The authors found that the highest T_C value (97 K) and the best crystallographic orientation

were obtained after a relatively short thallination time of 5 min.

Synthesis and properties of the complex perovskite oxide $DyBa_2ZrO_{5.5}$ are reported in a preprint by Y. P. Yadava et al. (Recife). The authors found that $DyBa_2ZrO_{5.5}$ is chemically stable with YBCO and that there is no degradation in YBCO's T_C even when mixed to a ratio of 1:1 with $DyBa_2ZrO_{5.5}$. The authors suggest that $DyBa_2ZrO_{5.5}$ is a candidate as a possible substrate material for YBCO superconductors.

Applications

The vertical levitation force in a cylindrically symmetric system composed of a permanent magnet and a type-II superconductor has been studied by C. Navau and A. Sanchez (Barcelona) assuming the superconductor to be in the critical state. The authors use the model to explain some recent experimental data on magnetic levitation of high- T_C superconductors, and they make some predictions for future experiments.

Levitation forces of field-cooled (2.3 T) and zero-field-cooled $YBa_2Cu_3O_{7-\delta}$ superconductors repelling a *SmCo* magnet are reported by W. Hennig et al. (Houston). The authors report large levitation forces (140 N) and pressures (44.6 N/cm²) in field-cooled measurements at 77 K. Five to ten subsequent cycles of approach and retreat of the magnet result in a 10-20% decrease in the levitation force, which then stabilizes.

A superconducting field-effect transistor (SuFET) with symmetrical gate structure of $YBa_2Cu_3O_{7-\delta}/SrTiO_3/YBa_2Cu_3O_{7-\delta}$ has been fabricated by T. Nakamura et al. (Sumitomo Electric). SuFET operation was achieved with a YBCO channel two unit cells in thickness, and the modulation factor exceeded 20%.

Theory

The interplay of the electron-phonon interaction and the spin-fluctuation interaction has been investigated by T. S. Nunner (Berlin) et al. for the superconducting state of $YBa_2Cu_3O_{7-\delta}$. The authors describe spin fluctuations within the nearly antiferromagnetic Fermi-liquid theory and treat phonons using a shell-model calculation. The authors obtain a superconducting state with $d_{x^2-y^2}$ symmetry generated by the antiferromagnetic spin fluctuations. Investigation of all phonon modes of the system shows that the phononic contribution to the d-wave pairing interaction is attractive, which is a necessary prerequisite for a positive isotope effect. The size of the isotope exponent is found to depend strongly on the relative strength of the electron-phonon and spin-fluctuation couplings. Because of the strong electronic

correlations, the authors find that no phonon-induced superconducting state, which is always of s-wave character, is possible.

As shown by O. V. Dolgov (Tübingen) et al., a sharp forward electron-phonon (FEP) interaction and forward impurity scattering (FIS) both change the normal and superconducting properties significantly. Pseudogap-like features are present in the density of states for $\omega < \Omega$, where Ω is the phonon frequency. The authors also find that the superconducting transition temperature due to FEP pairing becomes linear with respect to the electron-phonon coupling constant and that FIS impurities are pair-weakening for both s- and d-wave pairing.

A microscopic explanation of the pseudogap features found in the normal-state specific heat and magnetic susceptibility of the cuprates is proposed by A. S. Alexandrov (Loughborough) and G. J. Kaye (Cambridge). The authors use the framework of the bipolaron theory of high- T_C superconductors to explain the magnitude of the carrier specific heat and susceptibility as well as their universal scaling with temperature over a wide range of doping.

A preprint by F. Onufrieva et al. (Saclay) reports that a 2D free fermion system on a square lattice exhibits an electronic topological transition, with anomalous behavior on one side of this transition. The authors report that their theory has properties with striking similarities to the behavior found in the underdoped regime of the high- T_C cuprates.

The electronic contribution to the specific heat and thermal conductivity of high- T_C superconductors has been calculated by S. Dorbolo et al. (Liège) et al. using a 3D band structure including saddle points and a Lawrence-Doniach coupling between the CuO_2 planes. The authors deduce the electronic thermal diffusivity for s- and d-wave symmetry of the order parameter. The authors find that the theory and data on $DyBa_2Cu_3O_{7-\delta}$ and $Y_{0.9}Ca_{0.1}Ba_2Cu_3O_{7-\delta}$ are in good agreement with respect to the change of slope near T_C .

The effect of k-space broadening of the interlayer pairing kernel on the critical temperature T_C and gap anisotropy in high-temperature superconductors has been investigated by J. O. Fjærestad and A. Sudbø (Trondheim) using the interlayer pair tunneling mechanism. The authors find that the sharp k-space features obtained within a k-diagonal formulation are fairly robust to momentum broadening.

A preprint by M. T. Béal-Monod (Orsay) explores the number of superconducting temperatures to be expected in the high- T_C cuprates, depending on the possible attractive parts in the pairing interaction and the presence or absence of anisotropy. The author also examines the possibility that a complex hybrid pairing (d + is) occurs at $T = 0$ and a real one (d + s) occurs near T_C .

The magnetic response of normal-metal - superconductor proximity systems has been investigated by W. Belzig (Karlsruhe) et al. for arbitrary concentrations of impurities and at arbitrary temperatures. Using the quasiclassical theory, the authors derive a general linear-response formula, which yields a nonlocal current-field relation in terms of the zero-field Green's functions. The authors find a number of regimes where the physics is different from the previously studied clean and dirty limits.

The dc Josephson current in d-wave superconductors has been calculated by Y. Tanaka (Niigata) and S. Kashiwaya (Stanford) using self-consistently determined pair potentials. The results show that the suppression of the d-wave pair potential near the insulator does not have a serious effect on the properties of the Josephson current. On the other hand, drastic changes arise from the appearance of a subdominant s-wave component, which spontaneously breaks time-reversal symmetry. A previously predicted rapid enhancement of the Josephson current at low temperatures is strongly suppressed.

To clarify the origin of anomalous behavior found in $Pb/Sr_2RuO_4/Pb$ junctions, M. Yamashiro (Niigata) et al. have developed a theory of the dc Josephson current in s-wave superconductor/p-wave superconductor/s-wave superconductor junctions. Agreement of the theoretical and experimental results lends support to the possibility of a unitary p-wave pairing state in Sr_2RuO_4 .

Other Activities

A preprint by S. A. Sergeenkov (JINR, Dubna) uses a model of 3D Josephson junction arrays to consider how the Josephson supercurrent density of a weakly connected granular superconductor changes in response to an externally applied thermal gradient ∇T . For ∇T greater than a critical value, estimated to be of the order of 10^4 K/m for YBCO ceramics with an average grain size of 10 μm , the author predicts the weak-link-dominated thermopower S to become strongly dependent on ∇T .

The synthesis and characterization of a new hexagonal superconducting ($T_C \approx 3$ K) sulfide, $EuNb_2S_5$, are reported by S. Ya. Istomin (Moscow State) et al.

Overviews

The progress, status, and future of high-irreversibility-field superconductor processing for conductor applications are reviewed by J. L. MacManus-Driscoll (Imperial). A major section of the review concerns thin-film routes for fabricating $YBa_2Cu_3O_{7-\delta}$, because this is an area where there has been much recent progress using ion-beam-assisted deposition

(IBAD), rolling-assisted biaxially textured substrates (RABiTS), and related methods. The author also discusses other conductor-processing routes, including liquid-phase epitaxy (LPE), melt-textured growth (MTG), quench melt growth (QMG), powder-in-tube (PIT), screen printing, spray pyrolysis, spin coating or solution spinning, and electrophoresis. The author concludes by noting that future high- J_C conductors will likely embrace a hybrid thin-film/thick-film technology to achieve a compromise of all requirements, including cost, and thus to yield a high-quality, buffered, metallic substrate and a superconducting film (140 refs.).

A paper by R. A. Klemm (Argonne) surveys the results of transport and thermodynamic measurements, angle-resolved photoemission spectroscopy (ARPES), and Josephson-tunneling experiments. The author argues that these experiments give conflicting evidence with regard to the orbital symmetry of the superconducting order parameter in the high-temperature superconductors. The author also suggests the possible importance of charge-density waves (CDWs) or spin-density waves (SDWs) in these materials (59 refs.).

A brief review of measurements during the past ten years of electrical conductivity, thermal conductivity, and magnetic properties of narrow channels through oxidized films of atactic polypropylene, which have led to claims of room-temperature

superconductivity in such channels, has been prepared by D. M. Eagles (México). The author also discusses what is required from a theory to explain all the experimental results (21 refs.).

New developments in the melt texturing of 123 compounds are described, and some approaches to potential bulk applications are briefly reviewed in a preprint by K. Salama et al (TCSUH). The authors note that *Nd-123* and *Yb-123* show promise for reducing processing times in directional solidification. Texturing has been observed even in samples processed at rates as high as 100 mm/h (14 refs.).

Ph.D. Thesis

The Ph.D. thesis of R. Henn (Stuttgart) describes extensive studies of high- T_C materials (*La₂CuO₄*, *Gd₂CuO₄*, *La₂CuO₄*, *La_{2-x}Sr_xCuO₄*, *YBa₂Cu₃O_{7- δ}* , and *Y_{0.86}Ca_{0.14}Ba₂Cu₃O_{7- δ}*) performed by Fourier transform infrared ellipsometry using conventional sources and the synchrotron storage ring at Brookhaven. Included are determinations of phonon eigenvectors, ionic transverse charges, c-axis conductivity, and phonon anomalies as the temperature T drops below T_C (346 refs.).

Contributed by John R. Clem

Contents: Technology News begins on page 6; Preprints begin on page 7; Coming Events begin on page 14; and FYI is on page 15.

High- T_C Update is available without charge to interested persons. Recipients are expected to participate in this information exchange by sending us preprints, reprints, meeting news, research news, etc. Contributions to defray the cost of newsletter printing and mailing are welcome.

TECHNOLOGY NEWS

(Also see Applications section of Nota Bene.)

This section describes progress in manufacturing, product development, and technology transfer in the high- T_C superconductivity field. Please send your contributions (product development information, news regarding technology transfer efforts, or any information you would like to share about your corporation or laboratory) to the editor.

Using the powder-in-tube method, Nordic Superconductor Technologies (NST) of Denmark has manufactured a 1250 m reel of *BSCCO-2223* HTS tape. The tape cross-section measures 3.0 mm \times 0.2 mm, and is of the multifilamentary type (19 filaments) with pure silver matrix. The tape carries a current of 28 A at 77 K for a critical current density of 23.3 kA/cm² and a critical engineering current density of 5.2 kA/cm². The measurement was performed by I-V curves at 77 K and self-field using the 1 μ V/cm criterion as well as remanent-field continuous measurements. NST was founded on July 1, 1997 with the purpose of developing, manufacturing, and commercializing

high- T_C *BSCCO-2223* tape. NST currently also offers *Ag/Au* alloy tapes and oxidation-hardened alloy matrix tapes. For more information, contact Juan Farré, Nordic Superconductor Technologies A/S, Priorparken 878, DK 2605 Brøndby, Denmark; telephone +45 43 48 25 00; telefax +45 43 48 25 01; e-mail nst@nst.com.

Successful conclusion of Phase I of a field trial of its ClearSite™ superconductive receiver was announced by Conductus, Inc., with RadioFone, a Louisiana-based cellular/PCS operator. Tests of the ClearSite system by RadioFone demonstrated improved coverage, increased

minutes of use, and improved voice quality in a multi-base station deployment. RadioFone, headquartered in Metairie, Louisiana, began providing wireless services in Louisiana in 1948. The company provides a variety of communications services throughout Louisiana and in several other states. For further information, contact Susan Stone, Corporate

Communications Manager of Conductus, Conductus, Inc., 969 West Maude Ave., Sunnyvale, CA 94086; telephone (408) 523-9450; telefax (408) 523-9999.

Contributed by Sreeparna Mitra

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J. Albino Aguiar, D. A. Landinez Tellez, Y. P. Yadava, and J. M. Ferreira, "Structural and Magnetic Properties of the Complex Perovskite Oxide $Ba_2HoHfO_{5.5}$." To be published in Phys. Rev. B. Departamento de Física, Universidade Federal de Pernambuco, 50670-901 Recife, PE, BRAZIL; telephone +55 81 271 8450; telefax +55 81 271 0359; e-mail albino@npd.ufpe.br.

A. S. Alexandrov and G. J. Kaye, "Normal State Thermodynamics of Cuprate Superconductors." Submitted to Phys. Rev. Lett. Loughborough University, Loughborough, Leics LE11 3TU, UNITED KINGDOM; G. J. Kaye's telephone at University of Cambridge +44 1223 337078; telefax +44 1223 337074; e-mail gjk14@cus.cam.ac.uk; preprint also available at cond-mat@xxx.lanl.gov (#9804296). 74.20.-z.

K. M. Amm, P.V.P.S.S. Sastry, D. C. Knoll, S. C. Peterson, and J. Schwartz, "The Influence of Metallic Interfaces on the Properties of $(Hg,Bi)Ba_2Ca_2Cu_3O_y$ Superconductors." Submitted to Supercond. Sci. & Technol. Contact P.V.P.S.S. Sastry, Magnet Science and Technology, National High Magnetic Field Laboratory, Florida State University, 1800 East Paul Dirac Drive, Tallahassee, FL 32310; telephone (850) 644-1447; telefax (850) 644-0867; e-mail pamidi@magnet.fsu.edu.

S. Anders, R. Parthasarathy, H. M. Jaeger, P. Guptasarma, D. G. Hinks, and R. van Veen, "Dynamics of the Second Peak in the Magnetization of $Bi_2Sr_2CaCu_2O_8$ Crystals." Submitted to Phys. Rev. B. James Franck Institute and Department of Physics, University of Chicago, Chicago, IL 60637; preprint also available from Janice Coble, Materials Science Division, Argonne National Laboratory, 9700 South Cass Avenue, Argonne, IL 60439; telephone (630) 252-5497; telefax (630) 252-9595; e-mail coble@anl.gov.

M. Aprili, E. Paraoanu, and L. H. Greene, "Magnetic Anisotropy and Hysteresis of the Zero-Bias-Conductance-Peak in $YBCO/Pb$ Tunnel Junctions." Centre de Spectrométrie Nucléaire et de Spectrométrie de Masse, Bâtiment 108, F-91405 Orsay, FRANCE. 73.40.Gk; 74.50.+r; 74.76.Bz; 74.72.-h.

M. Ausloos and S. Dorbolo, "Cooper Pair-Like Systems at High Temperature and Their Role on Fluctuations Near the Critical Temperature." To be published in Int. J. Mod. Phys. B. SUPRAS B5, Sart Tilman, University of Liège, B-4000 Liège, BELGIUM; e-mail ausloos@gw.unipic.ulg.ac.be.

Kevin E. Bassler and Maya Paczuski, "A Simple Model of Superconducting Vortex Avalanches." Department of Physics, University of Houston, Houston, TX 77204-5506; telephone (713) 743-3568; e-mail bassler@uh.edu; preprint also available at cond-mat@xxx.lanl.gov (#9804249). 64.60.Lx; 64.60.Ht; 74.60.Ge.

M. T. Béal-Monod, "One or Two Transition Temperatures in High T_C Cuprates: Real or Complex Hybrid Pairings at Low Temperature." Submitted to Phys. Rev. B. Laboratoire de Physique des Solides, Université Paris-Sud, Bâtiment 510, F-91405 Orsay Cedex, FRANCE; telephone +33 1 6915-6928 or -6750; telefax +33 1 6915-6086; e-mail zazie@lps.u-psud.fr.

C. Beduz, E. Cereda, B. Dutoit, C. M. Friend, G. F. de la Fuente, T. Hughes, L. Le Lay, R. Navarro, D. M. Spiller, Y. Yang, and S. Zannella, "A Series of Round-Robin Measurements of the Self-Field ac Loss of $Bi-2223$ Tapes, Performed Under the Brite EuRam Research Program SACPA." To be published in Supercond. Sci. & Technol. Contact C. M. Friend, BICC Cables Ltd., Energy Technology Centre, Wrexham LL13 9XP, UNITED KINGDOM; telephone +44 1978 662612; telefax +44 1978 662464; e-mail cfriend@bicc.co.uk. 74.25.Fy; 74.60.Jg; 74.72.Hs; 85.25.Kx.

W. Belzig, C. Bruder, and A. L. Fauchère, "Diamagnetic Response of an N-S-Proximity System at Arbitrary Impurity Concentration." Institut für Theoretische Festkörperphysik, Universität Karlsruhe, D-76128 Karlsruhe, GERMANY; e-mail wolfgang@tfp.physik.uni-karlsruhe.de; preprint also available at cond-mat@xxx.lanl.gov (#9804285).

J. C. Cheang-Wong, M. Jergel, E. Andrade, C. Falcony, A. Morales, and A. Conde-Gallardo, "Correlation Between the T_I Concentration Depth Profiles and the Thallination Time

in *Tl-Ba-Ca-Cu-O* Superconducting Films." To be published in Nucl. Instr. and Methods in Phys. Res. B. Instituto de Física, UNAM, Apdo. Postal 20-364, 01000 Mexico DF, MEXICO; telefax +52 5 622 5009; e-mail cheang@fenix.ificacu.unam.mx. Key words: T_C superconductivity, *Tl*-based films, IBA techniques, chemical composition, concentration depth profiles. 29.30.Ep; 74.72.Fq; 74.76.Bz.

T. Cichorek, Z. Henkie, H. Drulis, and J. Klamut, "The Change of T_C^{onset} in $YBa_2Cu_3O_{7-y}$ Due to Hydrogenation." To be published in Physica C (in press). W. Trzebiatowski Institute for Low Temperature and Structure Research, Polish Academy of Sciences, P.O. Box 937, 50-950 Wrocław 2, POLAND; e-mail cichorek@int.pan.wroc.pl. Key words: hydrogenation, superconductors, superconducting transition temperature, thermoelectric power.

Alexander Denisov, "Possibilities of Designing of Matrix Millimeter Imaging Systems at the Base of Superconducting Elements." To be published in the Proc. of the Int. Soc. for Optical Engineering (SPIE) Meeting, Orlando, Fla., April 21-22, 1997. Apart. 89, Street Avtozavodskaya 81, Kiev 252114, UKRAINE; telephone +380 44 462 2246; telefax +380 44 462 2246; e-mail denisov@ukrpack.net. Key words: Josephson effect, superconductivity, radiometry, imaging system, millimeter waves.

P. Singha Deo, V. A. Schweigert, and F. M. Peeters, "Hysteresis in Mesoscopic Superconducting Disks: The Bean-Livingston Barrier." Department of Physics, University of Antwerp (UIA), Universiteitsplein 1, B-2610 Antwerpen, BELGIUM; e-mail deo@uia.ua.ac.be; F. M. Peeter's telephone +32 3 820 2478; telefax +32 3 820 2245; e-mail peeters@uia.ua.ac.be; preprint also available at cond-mat@xxx.lanl.gov (#9804174). 74.25.Ha; 74.60.Ec; 74.80.-g.

O. V. Dolgov, O. V. Danylenko, M. L. Kulic, and V. Oudovenko, "Forward Electron-Phonon Scattering in Normal and Superconducting States." To be published in Int. J. Mod. Phys. B. Institute für Theoretische Physik, Universität Tübingen, Tübingen, GERMANY; e-mail oleg.dolgov@uni-tuebingen.de; preprint also available at cond-mat@xxx.lanl.gov (#9804081).

S. Dorbolo, H. Bougrine, and M. Ausloos, "Electronic Contribution to the Thermal Diffusivity: $DyBa_2Cu_3O_{7-y}$ and $Y_{0.9}Ca_{0.1}Ba_2Cu_3O_{7-z}$." To be published in Int. J. Mod. Phys. B. SUPRAS B5, Sart Tilman, University of Liège, B-4000 Liège, BELGIUM; e-mail dorbolo@gw.unipc.ulg.ac.be.

R. A. Doyle, A. D. Bradley, W. Lo, D. A. Cardwell, A. M. Campbell, Ph. Vanderbemden, and R. Cloots, "High Field Behavior of Artificially-Engineered Boundaries in Melt-Processed $YBa_2Cu_3O_{7-\delta}$." To be published in Appl. Phys. Lett. Interdisciplinary Research Center in

Superconductivity, University of Cambridge, Cambridge CB3 0HE, UNITED KINGDOM.

D. M. Eagles, "Some Requirements for a Theory to Explain Probable Room-Temperature Superconductivity and Unusual Magnetic Properties of Narrow Channels in Oxidized Atactic Polypropylene." Presented at New Horizons in Mater. Sci., Juriquilla, Querétaro, Mexico, Jan. 1998; to be published in a supplement to Revista Mexicana de Física. 56 Portland Road, Tottenham, London N15 4SX, UNITED KINGDOM; e-mail d.eagles@ic.ac.uk. Key words: room-temperature superconductivity, diamagnetism, metamagnetism, atactic polypropylene. 73.61.Ph; 74.25.Ha; 74.70.Kn.

J. O. Fjærestad and A. Sudbø, "Non-k Diagonality in the Interlayer Pair-Tunneling Model of High- T_C Superconductivity." Department of Physics, Norwegian University of Science and Technology, N-7034 Trondheim, NORWAY.

Nina Ya. Fogel, Mikhail Yu. Mikhailov, Yuri V. Bomze, and Olga I. Yuzepovich, "Intrinsic Pinning, Commensurability and Reentrant Behavior on Superconducting *Mo/Si* Multilayers." Institute for Low Temperature Physics and Engineering, 47 Lenin Avenue, 310164 Kharkov, UKRAINE. 74.80.Dm; 74.60.Ge; 74.60.Jg.

K. Fujinami, M. Karppinen, and H. Yamauchi, "Investigation of Different Hole-Doping Routes in $Cu(Ba,Sr)_2(Yb_{1-x}Ca_x)Cu_2O_{6+z}$." To be published in Physica C (in press). Materials and Structures Laboratory, Tokyo Institute of Technology, Yokohama 226, JAPAN. Key words: $Cu(Ba,Sr)_2(Yb_{1-x}Ca_x)Cu_2O_{6+z}$, hole-doping routes, superconductivity.

T. Fukunaga, R. Inada, and A. Oota, "Field-Free Core, Current Distribution, and Alternating Current Losses in Self Fields for Rectangular Superconducting Tapes." To be published in Appl. Phys. Lett. Gifu National College of Technology, Shinsei-cho, Motosu-gun, Gifu 501-0495, JAPAN; A. Oota's e-mail oota@eee.tut.ac.jp. Key words: field-free core, current distribution, rectangular tape, alternating current losses, numerical calculations, rectangular tape. 74.60.Ge; 74.60.Jg; 74.70.-b.

E. Goodilin, M. Limonov, A. Panfilov, N. Khasanova, A. Oka, S. Tajima, and Y. Shiohara, "Oxygen Non-stoichiometry and Phase Transitions of the Neodymium-Rich $Nd_{1+x}Ba_{2-x}Cu_3O_z$ Solid Solution." To be published in Physica C (in press). Superconductivity Research Laboratory, International Superconductivity Technology Center (ISTEC), 10-13 Shinonome 1-chome, Koto-ku, Tokyo 135, JAPAN; telephone +81 3 3536-5714. Key words: $Nd_{1+x}Ba_{2-x}Cu_3O_z$, solid solution, oxygen nonstoichiometry, phase transition.

Ralf Henn, "Investigation of Raman Active Phonons and Free Carriers in High T_C Superconductors by Means of Far IR Ellipsometry." Submitted as a Ph.D. thesis (Universität Stuttgart). Contact Manuel Cardona, Max-Planck-Institut für Festkörperforschung, Heisenbergstrasse 1, D-70569 Stuttgart, GERMANY; e-mail cardona@cardix.mpi-stuttgart.mpg.de or birtel@cardix.mpi-stuttgart.mpg.de. (Thesis in German.)

W. Hennig, D. Parks, R. Weinstein, and R.-P. Sawh, "Enhanced Levitation Forces with Field Cooled $YBa_2Cu_3O_{7-\delta}$." Submitted to Appl. Phys. Lett. Beam Particle Dynamics Group and TCSUH, University of Houston, Houston, TX 77204-5506.

S. Ya. Istomin, A. Yu. Grippa, O. G. D'yachenko, E. V. Antipov, G. Svensson, and J. L. Tholence, "A New Superconducting Sulfide- $EuNb_2S_5$." To be published in Physica C (in press). Department of Chemistry, Moscow State University, 119899 Moscow, RUSSIA; telefax +7 095 939 4788; e-mail istomin@inorg.chem.msu.su. Key words: superconductivity, synthesis, *Eu*- and *Nb*-based sulfide.

Young A. Jee, Gye-Won Hong, Chan-Joong Kim, and Tae-Hyun Sung, "Dissolution of $SrBa_2Cu_3O_{7-y}$ Seed Crystals During Top-Seeded Melt Growth of $YBa_2Cu_3O_{7-y}$." To be published in Supercond. Sci. & Technol. Superconductivity Research Laboratory, Korea Atomic Energy Research Institute, P.O. Box 105, Yusong, Taejeon 305-600, SOUTH KOREA; telephone +82 42 868 8029; telefax +82 42 862 5496; e-mail icicle@nanum.kaeri.re.kr.

Liudi Jiang, Yuping Sun, Xinggong Wan, Kaiyou Wang, Guoyang Xu, Xianhui Chen, Keqing Ruan, and Jiaju Du, "Improvement of the Phase Formation and Superconductivity of the $(Bi,Pb)_2Sr_2Ca_2Cu_3O_x$ Silver-Sheathed Tapes with B_2O_3 Addition." To be published in Physica C (in press). Institute of Solid State Physics, Chinese Academy of Sciences, P.O. Box 1129, Hefei 230031, PEOPLE'S REPUBLIC OF CHINA. Key words: *Bi*2223/*Ag* tape, critical current density, B_2O_3 addition.

M. Z. Jin, X. Y. Li, M. L. Liu, R. Liu, and Y. Q. Jia, "Variation of Quadrupole Splitting at ^{151}Eu Nucleus in $EuBa_2Cu_3O_{7-x}$ Thick Film Around Superconducting Transition Temperature with Frequency of ac Electric Current." To be published in Physica C (in press). Contact Y. Q. Jia, Department of Chemistry, East China University of Science and Technology, Shanghai 200237, PEOPLE'S REPUBLIC OF CHINA. Key words: quadrupole splitting, $EuBa_2Cu_3O_{7-x}$ thick film, ac electric current.

S. T. Johnson, E. M. Forgan, S. H. Lloyd, C. M. Aegerter, S. L. Lee, R. Cubitt, P. G. Kealey, C. Ager, S. Tajima, A. Rykov, and D. McK. Paul, "Flux-Line Lattice Structures in Untwinned $YBa_2Cu_3O_{7-\delta}$." Submitted to Phys. Rev. Lett.

Laboratoire de Physique des Solides, Université Paris-Sud, Bâtiment 510, F-91405 Orsay Cedex, FRANCE; telefax +33 1 69 15 5654; e-mail stuart@lps.u-psud.fr; preprint also available at cond-mat@xxx.lanl.gov (#9804159). 74.60.Ge; 74.72.Bk; 61.12.Ex.

W. N. Kang, R. L. Meng, and C. W. Chu, "Growth of $HgBa_2Ca_2Cu_3O_8$ Thin Films Using Stable $ReO_3Ba_2Ca_2Cu_3O_x$ Precursor by Pulsed Laser Deposition." Preprint #98:034; submitted to Appl. Phys. Lett. Texas Center for Superconductivity, University of Houston, Houston, TX 77204-5932; telephone (713) 743-8200; telefax (713) 743-8201; e-mail preprints@www.tcs.uh.edu. 74.76.Bz; 74.72.Gr; 74.62.Bf; 74.62.Dh.

G. C. Kim, M. Y. Cheon, and Y. C. Kim, "Magnetic Field and Temperature Dependence of Intergranular Activation Energy in Polycrystalline $HgBa_2Ca_2Cu_3O_{8+\delta}$ and $(Ti,Pb,Bi)(Ba,Sr)_2Ca_2Cu_3O_y$ Superconductors." To be published in Physica C (in press). Contact Y. C. Kim, Department of Physics, Pusan National University, Pusan 609-735, SOUTH KOREA. Key words: ac susceptibility, granular superconductivity, activation energy.

Jin-Tae Kim, W. N. Kang, H. R. Lim, D. H. Kim, Y. K. Park, J.-C. Park, C. H. Kim, T. S. Hahn, S. S. Choi, J. D. Hettinger, and K. E. Gray, "Pinning Effect on Critical Dynamics in $YBa_2Cu_3O_{7-\delta}$ Films with Inherent Random Disorder and with Columnar Defects." To be published in Physica C (in press). Superconductivity Group, Korea Research Institute of Standards and Science, P.O. Box 102, Yusong, Taejeon 305-600, SOUTH KOREA. Key words: YBCO films, conductivity, crystal.

Hitoshi Kitaguchi, Hanping Miao, Hiroaki Kumakura, Kazumasa Togano, and Bernard Chenevier, "Critical Current Density Distribution in Superconducting Oxide Layer of $Bi_2Sr_2CaCu_2O_x/Ag$ Composite Tapes." To be published in Physica C (in press). National Research Institute for Metals, 1-2-1 Sengen, Tsukuba, 305, JAPAN; telephone +81 298 59 2329; telefax +81 298 59 2301; e-mail hk@nrim.go.jp. Key words: *Bi*-2212, critical current density, critical current, thickness dependence. 74.72.Hs; 85.25.Kx.

R. A. Klemm, "The Orbital Symmetry of the Order Parameter in HTSC: The Controversy Continues." Materials Science Division, Argonne National Laboratory, 9700 South Cass Avenue, Argonne, IL 60439; e-mail richard_klemm@qmgate.anl.gov.

Akito Kobayashi, Yoshiaki Ono, Tamifusa Matsuura, and Yoshihiro Kuroda, "Dynamical Spin Susceptibility of the d-p Model in the Overdoping Region." To be published in Physica C (in press). CREST, Japan Science and Technology (JST), 1-1-1 Tennodai, Tsukuba, Ibaraki 305, JAPAN. Key words: high- T_C superconductivity, d-p

model, auxiliary-boson technique, $1/N$ expansion, RPA, quasiparticle interaction, nesting, spin fluctuation, dynamical spin susceptibility, spin-lattice relaxation rate, spin-spin relaxation rate, spin Knight shift.

M. R. Koblischka, A.J.J. van Dalen, T. Higuchi, S. I. Yoo, and M. Murakami, "Analysis of Pinning in $NdBa_2Cu_3O_{7-\delta}$ Superconductors." To be published in Phys. Rev. B. Superconductivity Research Laboratory, International Superconductivity Technology Center (ISTEC), 1-16-25 Shibaura, Minato-ku, Tokyo 105, JAPAN; telephone +81 3 3454 9284; telefax +81 3 3454 9287; e-mail koblischka@istec.or.jp.

A. A. Kordyuk, V. V. Nemoshkalenko, R. V. Viznichenko, and W. Gawalek, "Reconstruction of Critical Current Profiles from ac Loss Measurements." Presented at the Int. Cryogenic Mater. Conf. (ICMC'98), Enschede, The Netherlands, May 10-13, 1998; to be published in Physica C. Institute of Metal Physics, 36 Vernadsky str., Kyiv 252680, UKRAINE; phone +380 44 444 9538; fax +380 44 444 2561; e-mail kord@imp.kiev.ua. Key words: hysteretic losses, critical current profile, HTS bulks, degradation.

K. I. Kugel, L. G. Mamsurova, K. S. Pigalskiy, and A. L. Rakhmanov, "Surface Barrier and Magnetic Hysteresis of ac Permeability in $YBaCuO$ Single Crystal." To be published in Physica C (in press). Scientific Center for Applied Problems in Electrodynamics, Russian Academy of Sciences, Izhorskaya ul. 13/19, Moscow 127412, RUSSIA; telefax +7 095 484 2633; e-mail kugel@theor.termo.msk.ru. Key words: $YBa_2Cu_3O_x$ single crystal, mixed state, magnetic permeability, hysteresis, surface barrier.

Bumsoo Kyung, "Evolution of the Fermi Surface Geometry in High T_C Superconductors: From Small Hole Pockets to a Large Tight Binding Fermi Surface." To be published in Physica C (in press). Max Planck Institut for Physics of Complex Systems, Noethnitzer Str. 38, D-01187 Dresden, GERMANY. Key words: angle-resolved photoemission, Fermi surface, hole concentration. 71.27.+a; 74.25.-q.

R. Laiho, E. Lähderanta, and A. C. Bódi, "Flux Dynamics During the Superconducting Transition of a YBCO Sample Exposed to a Temperature Gradient." To be published in Physica C (in press). Contact A. C. Bódi, Institute of Experimental Physics, Kossuth University, P.O. Box 105, H-4001 Debrecen, HUNGARY; telephone +36 52 415 222; telefax +36 52 315 087; e-mail acbodi@moon.atomki.hu. Key words: fluctuations, flux pinning, ac susceptibility of superconductors. 74.40.+k; 74.60.Ge; 74.72.Bk.

K. A. Lokshin, D. A. Pavlov, M. L. Kovba, E. V. Antipov, I. G. Kuzemskaya, L. F. Kulikova, V. V. Davydov, I. V. Morozov, and E. S. Itskevich, "Synthesis and Characterization of Overdoped $Hg-1234$ and $Hg-1245$ Phases: The

Universal Behavior of T_C Variation in the $HgBa_2Ca_{n-1}Cu_nO_{2n+2+\delta}$ Series." To be published in Physica C (in press). Contact E. V. Antipov, Department of Chemistry, Moscow State University, 119899 Moscow, RUSSIA; telefax +7 095 939 4788; e-mail antipov@inorg.chem.msu.su; or E. S. Itskevich, Institute of High Pressure Physics RAS, 142092 Troitsk, Moscow, RUSSIA; telefax +7 095 939 4788; e-mail itskev@ns.hppi.troitsk.ru. Key words: $Hg-1234$, $Hg-1245$, high-pressure synthesis, heat treatments.

J. L. MacManus-Driscoll, "Recent Developments in Conductor Processing of High Irreversibility Field Superconductors." To be published in Annu. Rev. Mater. Sci. Department of Materials and Centre for High Temperature Superconductivity, Imperial College, Prince Consort Road, London SW7 2BP, UNITED KINGDOM; telephone +44 171 594 6749; telefax +44 171 584 3194; e-mail j.driscoll@ic.ac.uk. Key words: $YBa_2Cu_3O_{7-x}$, IBAD, RABITS, thick film, $Tl-1223$.

Shinobu Matsuura, Takahiro Taneda, Wataru Yamaguchi, Hiroharu Sugawara, Tetsuya Hasegawa, and Koichi Kitazawa, "Reproducible Superconducting Gap on Clean Surfaces of $BiSrCaCuO$ Prepared by Etching with a Scanning Tunneling Microscope Tip." To be published in Physica C (in press). Department of Superconductivity, University of Tokyo, Hongo 7-3-1, Bunkyo-ku, Tokyo 113, JAPAN; telefax +81 3 3815 5632; e-mail tt66862@hongo.ecc.u-tokyo.ac.jp. Key words: scanning tunneling microscopy, tunneling spectroscopy, surface etching, energy gap, background conductance. 73.40.Gk; 74.50.+r; 74.72.Hs.

H. Miao, H. Kitaguchi, H. Kumakura, K. Togano, and T. Hasegawa, "Effects of PAIR (Pre-Annealing and Intermediate Rolling) Process on Superconducting Properties of $Bi_2Sr_2CaCu_2O_x/Ag$ Multilayer Tapes." To be published in Physica C (in press). Contact H. Kitaguchi, National Research Institute for Metals, 1-2-1 Sengen, Tsukuba 305, JAPAN; phone +81 298 59 2329; fax +81 298 59 2301; e-mail hk@nrim.go.jp. Key words: $Bi-2212$, tape conductor, critical current density, fabrication process. 74.72.Hs; 85.25.Kx.

T. Nakamura, H. Inada, and M. Iiyama, "Superconducting Field Effect Transistors with $YBa_2Cu_3O_{7-x}/SrTiO_3/YBa_2Cu_3O_{7-x}$ Trilayer Structure." To be published in Physica C (in press). Basic High-Technology Laboratories, Sumitomo Electric Industries, 1-1-3 Shimaya, Konohana-ku, Osaka 554, JAPAN; telephone +81 6 466 6502; telefax +81 6 464 3564; e-mail nakamura@asd.sei.co.jp. Key words: superconductivity, $YBa_2Cu_3O_{7-x}$, $SrTiO_3$, electric field, thin film. 74.25.Fy; 74.80.Dm; 74.76.Bz.

Carles Navau and Alvaro Sanchez, "Magnetic Levitation of Superconductors in the Critical State." To be published in Phys. Rev. B. Contact Alvaro Sanchez, Grup d'Electromagnetisme, Departament de Física,

Universitat Autònoma de Barcelona, E-08193 Bellaterra (Barcelona), Catalonia, SPAIN; telephone +34 93 581 1132; telefax +34 93 581 1350; e-mail alvar@elema.uab.es.

Yusuke Niiori, Yasuji Yamada, Izumi Hirabayashi, Tetsuo Fujiwara, and Kazutoshi Higashiyama, "In-Plane Aligned $YBa_2Cu_3O_{7-x}$ Film on the MgO Buffered $Ag(100)$ Substrate and $\{100\}\{100\}$ Cubic Textured Silver Tape." To be published in Physica C (in press). Superconductivity Research Laboratory, International Superconductivity Technology Center (ISTEC), c/o Japan Fine Ceramics Center, 2-4-1 Mutsuno Atsuta-ku, Nagoya 456, JAPAN; telephone +81 52 871 4002; telefax +81 52 871 4090; e-mail niiori@istec.or.jp. Key words: $YBa_2Cu_3O_{7-x}$, MgO , silver, buffer layer, pulsed laser deposition, LPE. 74.72.Bk; 74.76.Bz; 81.15.Fg; 81.15.Lm.

T. S. Nunner, J. Schmalian, and K. H. Bennemann, "Influence of Electron-Phonon Interaction on Spin Fluctuation Induced Superconductivity." Institut für Theorie der Kondensierten Materie, Universität Karlsruhe, D-76128 Karlsruhe, GERMANY; e-mail nunner@tkm.physik.uni-karlsruhe.de; preprint also available at cond-mat@xxx.lanl.gov (#9804088).

H. Nylén, M. Qvarford, G. Chiaia, O. Tjernberg, S. Söderholm, A. A. Zakharov, M. Leandersson, V. G. Nazin, M. B. Tsetlin, L. Lev, J. N. Andersen, R. Nyholm, I. Lindau, U. O. Karlsson, M. N. Mikheeva, and L. Leonyuk, "O KVV Auger Emission Versus Resonant Photoemission at the O K Edge of High- T_C Superconductors." To be published in Physica C (in press). Department of Synchrotron Radiation Research, Institute of Physics, Lund U., Box 118, S-221 00 Lund, SWEDEN. Key words: Coulomb interactions, $Cu-O$ planes, electronic structure, resonant photoemission. 74.25.Jb; 78.70.Dm; 79.60.-i.

Kunihiko Oka, Zhigang Zou, and Jinhua Ye, "Crystal Growth of Superconductive $PrBa_2Cu_3O_{7-y}$." To be published in Physica C (in press). Electrotechnical Laboratory, 1-1-4 Umezono, Tsukuba 305, JAPAN; telephone +81 298 54 5441; telefax +81 298 54 5085; e-mail koka@etl.go.jp. Key words: superconductivity, $PrBa_2Cu_3O_{7-y}$, crystal growth, TSFZ method.

Akira Ono and Akio Watanabe, "Superconductivity, Ca Content and Oxygen Deficiency of $Ga(Sr,Ca)_2(Yb,Ca)-Cu_2O_7$." To be published in Physica C (in press). National Institute for Research in Inorganic Materials, 1-1 Namiki, Tsukuba 305, JAPAN; telefax +81 298 52 7449; e-mail ono@nirim.go.jp. Key words: high-pressure annealing, $Ga-1212$ cuprate, Ca substitution, oxygen deficiency.

F. Onufrieva, P. Pfeuty, and M. Kisselev, "New Scenario for High- T_C Cuprates: Electronic Topological Transition as a Motor for Anomalies in the Underdoped Regime."

Submitted to Phys. Rev. Lett. Laboratoire Leon Brillouin, CE-Saclay, F-91191 Gif-sur-Yvette, FRANCE; M. Kisselev's e-mail kisselev@llb.saclay.cea.fr; preprint also available at cond-mat@xxx.lanl.gov (#9804189).

H. H. Otto, S. Ringshandl, and R. Baltrusch, " $(Tl,Pb,Cu)Sr_2(Tl,Pb,Cu)_2Cu_2O_{8-\delta}$: A Nonsuperconducting $Tl-1222^*$ Cuprate with Both Heavy Atom Single and Oxygen Depleted Double Layer Motifs." To be published in Physica C (in press). Materialwissenschaftliche Kristallographie, TU Clausthal, Adolph-Roemer-Strasse 2A, D-38678 Clausthal-Zellerfeld, GERMANY. Key words: Tl -based '1222*' compound, nonsuperconducting cuprate, single crystals, systematology.

Y. V. Piskunov, K. N. Mikhaleva, Yu. I. Zhdanov, A. P. Gerashenko, S. V. Verkhovskii, K. A. Okulova, E. Yu. Medvedev, A. Yu. Yakubovskii, L. D. Shustov, P. V. Bellot, and A. Trokiner, "Influence of the Doping Level on the Charge Distribution Among the Inequivalent CuO_2 Layers in $Tl_2Ba_2Ca_2Cu_3O_{10-\delta}$: a NMR Study." To be published in Physica C (in press). Contact S. V. Verkhovskii, Institute of Metals Physics, Kovalevskaya str. 18, Ekaterinburg 620219, RUSSIA; telefax +7 3432 74 5244; e-mail verkhovskii@ifm.ural.ru. Key words: ^{63}Cu , ^{17}O NMR, Knight shift, electric field gradient, $Tl_2Ba_2Ca_2Cu_3O_{10-\delta}$, CuO_2 planes, distribution of holes.

T. Puig, B. Martínez, R. Yu, A. Hu, V. Gomis, F. Sandiumenge, and X. Obradors, "Critical Currents in Air Processed $NdBa_2Cu_3O_7$ Melt-Textured Superconductors." To be published in Appl. Supercond. Institut de Ciència de Materials de Barcelona, C.S.I.C., Campus Universitat Autònoma de Barcelona, E-08193 Bellaterra, SPAIN; telephone +34 9 3 580 1853; telefax +34 9 3 580 5729; e-mail teresa.puig@icmab.es.

T. Puig, M. Pont, P. G. Huggard, F. de la Cruz, W. Prettl, and J. S. Muñoz, "A Novel Technique to Measure Relaxation of High Temperature Superconducting Films on Ultra Short Time Scales." To be published in Supercond. Sci. & Technol. Institut de Ciència de Materials de Barcelona, C.S.I.C., Campus Universitat Autònoma de Barcelona, E-08193 Bellaterra, SPAIN; telephone +34 9 3 580 1853; telefax +34 9 3 580 5729; e-mail teresa.puig@icmab.es.

J. J. Rabbers, B. ten Haken, F. Gömöry, and H.H.J. ten Kate, "Self-Field Loss of $BSCCO/Ag$ Tape in External ac Magnetic Field." To be published in Physica C (in press). Faculty of Applied Physics, Low Temperature Division, University of Twente, P.O. Box 217, 7500 AE Enschede, THE NETHERLANDS. Key words: $BSCCO/Ag$ tape, ac magnetic field, voltage-current relationship.

L. Richard, M. F. Denanot, J. Rabier, F. Sandiumenge, E. Rodriguez, B. Martinez, and X. Obradors, "Microstruc-

ture and Flux Dynamics in $YBa_2Cu_3O_7$ Plastically Deformed at Room Temperature." To be published in Physica C. Laboratoire de Métallurgie Physique, UMR 6630, Université de Poitiers, UFR Sciences, CNRS SP2MI, Boulevard 3, Télépôt 2, BP 139, F-86960 Futuroscope Cedex, FRANCE; J. Rabier's telephone +33 5 4949 6642; telefax +33 5 4949 6692. Key words: high- T_C superconductors, transmission electron microscopy, dislocation, critical current.

K. Salama, S. Sathyamurthy, S. P. Athur, and P. Putman, "Recent Developments in Melt Texturing of 123 Compounds." Preprint #98:033; submitted to the Proc. of the 9th Int. Conf. on Mod. Mater. & Technol. (CIMTEC '98), Florence, Italy, June 14-19, 1998. Texas Center for Superconductivity, University of Houston, Houston, TX 77204-5932; telephone (713) 743-8200; telefax (713) 743-8201; e-mail preprints@www.tcs.uh.edu.

P.V.P.S.S. Sastry and J. Schwartz, "Synthesis and Processing of Doped $Hg_1Ba_2Ca_2Cu_3O_y$ Superconductors." Submitted to J. Supercond. Magnet Science and Technology, National High Magnetic Field Laboratory, Florida State University, 1800 East Paul Dirac Drive, Tallahassee, FL 32310; telephone (850) 644-1447; telefax (850) 644-0867; e-mail pamidi@magnet.fsu.edu.

Ravi-Persad Sawh, Yanru Ren, Roy Weinstein, Wolfgang Hennig, and Takayuki Nemoto, "Uranium Chemistry and Pinning Centers in HTS." Submitted to Physica C. Beam Particle Dynamics, University of Houston, Houston, TX 77204-5506. Key words: chemical pinning center, critical current density, superconducting magnet, flux pinning.

V. A. Schweigert and F. M. Peeters, "Phase Transitions in Thin Mesoscopic Superconducting Disks." To be published in Phys. Rev. B. Departement Natuurkunde, Universiteit Antwerpen (UIA), Universiteitsplein 1, B-2610 Antwerpen, BELGIUM; F. M. Peeter's telephone +32 3 820 2478; telefax +32 3 820 2245; e-mail peeters@uia.ua.ac.be. 74.25.Ha; 74.60.Ec; 73.20.Dx.

V. A. Schweigert, F. M. Peeters, and P. S. Deo, "Vortex Phase Diagram for Mesoscopic Superconducting Disks." Departement Natuurkunde, Universiteit Antwerpen (UIA), Universiteitsplein 1, B-2610 Antwerpen, BELGIUM; F. M. Peeter's telephone +32 3 820 2478; telefax +32 3 820 2245; e-mail peeters@uia.ua.ac.be. 74.60.Ec; 73.20.Dx.

Sergei Sergeenkov, "Nonlinear Seebeck Effect in a Model Granular Superconductor." To be published in JETP Lett. Bogoliubov Laboratory of Theoretical Physics, Joint Institute for Nuclear Research, 141980 Dubna, Moscow, RUSSIA; e-mail ssa@thsun1.jinr.dubna.su.

T. Shaposhnikova, Yu. Vashakidze, R. Khasanov, and Yu. Talanov, "Peculiarities of the Vortex Dynamics in $YBa_2Cu_3O_x$ Single Crystals as Revealed by Irreversible Microwave Absorption." To be published in Physica C (in press). Contact Yu. Talanov, Kazan Institute for Technical Physics, Sibirskii tract 10/7, 420029 Kazan, RUSSIA; telephone +7 8432 761154; telefax +7 8432 765075; e-mail talanov@dionis.kfti.kcr.ru. Key words: $YBa_2Cu_3O_x$ single crystals, microwave absorption, vortex matter phase diagram. 74.25.Nf; 74.60.Ge; 74.60.Jg.

Vilas Shelke, H. S. Tewari, N. K. Gaur, and R. K. Singh, "Effect of Hg Addition on Synthesis of Bi-Based Superconductors." To be published in Physica C (in press). Contact R. K. Singh, Guru Ghasidas University, Bilaspur (M.P.) 495009, INDIA. Key words: Hg addition, Bi-based superconductors, synthesis.

E. D. Specht, A. Goyal, D. F. Lee, F. A. List, D. M. Kroeger, M. Paranthaman, R. K. Williams, and D. K. Christen, "Cube-Textured Nickel Substrates for High-Temperature Superconductors." To be published in Supercond. Sci. & Technol. Oak Ridge National Laboratory, P.O. Box 2008, MS 6118, Oak Ridge, TN 37831-6118; telephone (423) 574-7682; telefax (423) 574-7659; e-mail esy@ornl.gov.

T. Strach, T. Ruf, A. M. Niraimathi, A. A. Martin, and M. Cardona, "Raman Study of Phonons and Crystal-Field Excitations in $NdBa_2Cu_{3-x}Ga_xO_{7-\delta}$." To be published in Physica C (in press). Contact T. Ruf, Max-Planck-Institut für Festkörperforschung, Heisenbergstrasse 1, D-70569 Stuttgart, GERMANY; telephone +49 711 689 1735; telefax +49 711 689 1712; e-mail ruf@cardix.mpi-stuttgart.mpg.de. Key words: high- T_C superconductors, doping effects, charge transfer, crystal-field excitations, Raman scattering. 74.72.Bk; 78.30.-j; 71.70.Ch.

Ajay Mohan Suvarna and C. S. Sunandana, "Magnetic Penetration Depth in K-Doped $Bi-2212 Bi_2Sr_2CaCu_{2-x}K_xO_{8+\delta}$: ESR Study." To be published in Physica C (in press). Contact C. S. Sunandana, School of Physics, University of Hyderabad, P.O. Central University, Hyderabad 500 046, INDIA; e-mail csssp@uohyd.ernet.in. Key words: magnetic penetration, $Bi_2Sr_2CaCu_{2-x}K_xO_{8+\delta}$, ESR study.

V. M. Svistunov, V. Yu. Tarenkov, A. I. Dyachenko, O. I. Chernyak, and R. Aoki, "Contact Phenomena in $YBCO/Ag$ Composites." To be published in Physica C. Department of Superconductivity & Tunneling Spectroscopy, A. A. Galkin Donetsk Physico & Technical Institute, National Academy of Sciences, 72 R. Luxemburg St., 340114 Donetsk, UKRAINE; telefax +380 622 55 0127; e-mail svistuno@hsts.dipt.donetsk.ua.

Yukio Tanaka and Satoshi Kashiwaya, "Influences of Broken Time-Reversal Symmetry on the dc Josephson Effects in d-Wave Superconductors." Graduate School of Science and Technology and Department of Physics, Niigata University, Ikarashi, Niigata 950-21, JAPAN; preprint also available at cond-mat@xxx.lanl.gov (#9803349).

C. Topaçlı, "Magnetically Modulated Microwave Absorption Studies on High- T_C Powdered Materials." To be published in Physica C (in press). Department of Physics, Hacettepe University, Beytepe 06532, TURKEY. Key words: magnetically modulated microwave absorption (MMA), high- T_C material, $Bi_2Sr_2Ca_2Cu_3O_y$, $Bi_2Sr_2Ca_1Cu_2O_y$, $Y_1Ba_2Cu_3O_y$.

Ph. Vanderbemden, A. D. Bradley, R. A. Doyle, W. Lo, D. M. Astill, D. A. Cardwell, and A. M. Campbell, "Superconducting Properties of Natural and Artificial Grain Boundaries in Bulk Melt-Textured YBCO." Submitted to Physica C. Institut D'Electricite Montefiore, SUPRAS, Université de Liège, Sart-Tilman B28, B-4000 Liège, BELGIUM; telephone +32 4366 2674; telefax +32 4366 2877; e-mail vanderbe@montefiore.ulg.ac.be.

N. Watanabe, K. Kuroda, K. Abe, N. Koshizuka, M. Tagami, and Y. Shiohara, "Phonon Raman Scattering in $Nd_{1+x}Ba_{2-x}Cu_3O_{7-\delta}$ and $Pr_{1+x}Ba_{2-x}Cu_3O_{7-\delta}$ Single Crystals." To be published in Physica C (in press). Superconductivity Research Laboratory, International Superconductivity Technology Center (ISTEC), 10-13 Shinonome 1-chome, Koto-ku, Tokyo 135, JAPAN; telephone +81 3 3536 5707; telefax +81 3 3536 5705; e-mail nabe@istec.or.jp. Key words: $Nd_{1+x}Ba_{2-x}Cu_3O_{7-\delta}$, $Pr_{1+x}Ba_{2-x}Cu_3O_{7-\delta}$, electron phonon coupling, phonon spectrum, Raman scattering, substitution effects. 78.30.-j.

K. Widder, J. Münzel, M. Göppert, D. Lüerssen, R. Becker, A. Dinger, H. P. Geserich, C. Klingshirn, M. Kläser, G. Müller-Vogt, J. Geerk, and V. M. Burlakov, "Optical Investigations of Oxygen Ordering and Persistent Photo-Doping in Tetragonal YBCO." To be published in Physica C (in press). Institut für Angewandte Physik, Universität Karlsruhe, D-76128 Karlsruhe, GERMANY. Key words: Cu-O chains, infrared spectroscopy, optical reflectivity, O-T transition.

X.-J. Wu, T. Tatsuki, S. Adachi, and K. Tanabe, "Structural Evolution of a $(Hg_{0.6}, Tl_{0.4})_2Ba_2Ca_2Cu_3O_{9.9}$ Superconductor Induced by Reduction." To be published in Physica C (in press). Superconductivity Research Laboratory, International Superconductivity Technology Center (ISTEC), 10-13 Shinonome 1-chome, Koto-ku, Tokyo 135, JAPAN; telephone +81 3 3536-5703 through -5705; telefax +81 3 3536-5714 or -5717. Key words: (Hg, Tl) -2223 phase, Ar annealing treatment, crystal structural evolution, Rietveld refinement.

X. S. Wu, X. H. Xiang, W. M. Chen, Y. Li, W. J. Liu, and S. S. Jiàng, "Structural Anomalies in $LaBa_2Cu_3O_x$ Cuprates with Iron Substitution." To be published in Physica C (in press). National Laboratory of Solid State Microstructures, Institute of Solid State Physics, Nanjing University, Nanjing 210093, PEOPLE'S REPUBLIC OF CHINA. Key words: $LaBa_2Cu_3O_x$ with iron doping, x-ray diffraction, Rietveld refinements, anomalous structural phase transition.

Yuan Wu, Wei Liu, Lie Chen, and Lin Li, "Lattice Image of $Tl_2Ba_2CaCu_2O_8$ Thin Films Grown on Tilted Surface of $LaAlO_3$ Substrate." To be published in Physica C (in press). National Laboratory of Superconductivity, Institute of Physics and Center for Condensed Matter Physics, Chinese Academy of Sciences, Beijing 100080, PEOPLE'S REPUBLIC OF CHINA. Key words: $Tl_2Ba_2CaCu_2O_8$ thin films, tilted $LaAlO_3$ substrate, transmission electron microscopy.

Y. P. Yadava, D. A. Landinez Tellez, M. T. de Melo, J. M. Ferreira, and J. Albino Aguiar, "Study of Structural Ordering and Chemical Stability of a Complex Perovskite Oxide $DyBa_2ZrO_{5.5}$ with $YBa_2Cu_3O_{7-\delta}$ Superconductor." To be published in Appl. Phys. A. Contact J. Albino Aguiar, Departamento de Física, Universidade Federal de Pernambuco, 50670-901 Recife-PE, BRAZIL; telephone +55 81 271 8450; telefax +55 81 271 0359; e-mail albino@npd.ufpe.br. 74.60.-w.

Masashi Yamashiro, Yukio Tanaka, and Satoshi Kashiwaya, "Theory of the dc Josephson Effect in $Pb/Sr_2RuO_4/Pb$." Graduate School of Science and Technology, Niigata University, Ikarashi, Niigata 950-2181, JAPAN; e-mail masashi@bussei.sc.niigata-u.ac.jp; preprint also available at cond-mat@xxx.lanl.gov (#9803348).

Y. Yang, J. Gao, J. L. Sun, T. C. Chui, and L. Li, "Microstructural Study of Ramp Type Multilayer Josephson Junctions with Different Ramp Slopes." To be published in Physica C (in press). Contact J. Gao, Department of Physics, University of Hong Kong, Pokfulam Road, Hong Kong, PEOPLE'S REPUBLIC OF CHINA. Key words: HREM, thin films, Josephson effect, defect structures.

S. Zannella, E. Cereda, G. Coletta, G. Crotti, L. Gherardi, and V. Ottoboni, "Self-Field ac Losses of Single Phase Bi-2223 Cable Conductor by Calorimetric Method." Submitted to the Proc. of the 9th CIMTEC Symp. VI, "Science and Applications of HTSC," Florence, Italy, June 14-19, 1998. Contact E. Cereda, CISE, P.O. Box 12081, I-20134 Milano, ITALY; e-mail ezio.cereda@s1.cise.it.

R. Zeng, H. K. Liu, and S. X. Dou, "A New Structural Powder/Wire-in-Tube (PWIT) Ag-Sheathed Multifilamentary Bi-2223 Tapes and Its Superconducting Properties." To be published in Physica C (in press). Center for Superconducting and Electronic Materials, University of Wollongong, Wollongong NSW 2522, AUSTRALIA; telefax +61 42 215731; e-mail rong@uow.edu.au. Key words: Ag/superconductor interface, Bi-2223 tapes, critical current density.

Y. T. Zhu, E. J. Peterson, P. S. Baldonado, J. Y. Coulter, D. E. Peterson, and F. M. Mueller, "Crystal Structure and Chemistry of Four New $R\text{Ba}_4\text{Cu}_3\text{O}_{8.5+\delta}$ ($R=\text{Ho, Er, Tm}$ and Yb) Compounds." Submitted to J. Alloy Compds. Materials Science and Technology Division, Mail Stop G755, Los Alamos National Laboratory, Los Alamos, NM 87545; telephone (505) 667-4029; telefax (505) 667-2264; e-mail yzhu@lanl.gov. Key words: Ho143, Er143, Tm143, Yb143, Rietveld refinement, crystal structure, space group, cuprate.

COMING EVENTS

(An * indicates a previously listed event.)

***July 12 - 15, 1998:** 1998 International Workshop on Superconductivity: Materials and Technology Issues for HTS Wires and Bulk Applications, Okinawa Harborview Hotel, Naha-shi, Okinawa, Japan. Workshop will focus on high-temperature superconductors in all forms. Topics of interest are: physics and characterization of HTS bulks, wires, and tapes; crystal growth and processing; applications; flux pinning and flux dynamics; ac losses; and novel materials. A significant amount of time will be allotted for discussion of each paper, and extra time will be set aside for informal interactions among the participants. No parallel sessions. For information, contact Kiyomi Funakoshi, Workshop Secretary, Superconductivity Research Lab., International Superconductivity Technology Center (ISTEC), Eishin Kaihatsu Bldg. 6F, 34-3, Shinbashi 5-chome, Minato-ku, Tokyo 105-0004, Japan; telephone +81 33431 4002; telefax +81 3 3431 4044; e-mail funa@istec.or.jp or t-kobayashi@istec.or.jp.

***July 19 - 24, 1998:** Gordon Research Conference on Correlated Electron Systems, Plymouth State College, Plymouth, N.H. Conference will survey significant experimental and theoretical developments in the study of electronic correlations in the cuprates and related materials, heavy-fermion systems, and two-dimensional electron gases. Co-Chairs: Laura H. Greene and Subir Sachdev. A substantial block of time will be set aside for discussions to be coordinated by the session chair. Will include formal invited sessions and contributed poster sessions; discussion on posters will be integrated into the formal sessions. Topics are: spin chains and ladders,

mesoscopic superconductivity, broken time-reversal symmetry, correlated fermions in adsorbed layers, one-dimensional conductors, heavy fermions, and two-dimensional electron gas. All prospective attendees (including invited speakers) must submit an application. **Application deadline, June 5, 1998.** For information, contact Gordon Research Conferences, University of Rhode Island, P.O. Box 984, West Kingston, RI 02892-0984; telephone (401) 783-4011; telefax (401) 783-7644; e-mail app@grcmail.grc.uri.edu (for application form requests) or grc@grcmail.grc.uri.edu (for general information). Information also available at Web site <http://sachdev.physics.yale.edu/grc/index.html>.

***Sept. 10 - 15, 1998:** XXII International School of Theoretical Physics – Quantum Coherence in Superconductors and Nanostructures, Ustron, Poland. Topics include quantum coherence in nanostructures, Coulomb blockade in quantum dots, strongly correlated electrons in high-temperature superconductivity, and coherent phenomena in superconductors. **Abstract deadline, May 30, 1998; registration deadline, June 30, 1998.** For information, contact Elzbieta Zipper, Institute of Physics, University of Silesia, ul. Uniwersytecka 4, 40-007 Katowice, Poland; telephone +48 32 583653; telefax +48 32 588431; e-mail thschool@us.edu.pl; Web site <http://server.phys.us.edu.pl/thschool/>.

***Sept. 14 - 25, 1998:** NATO Advanced Study Institute – Material Science, Fundamental Properties and Future Electronic Applications of High- T_c Superconductors, Albena, Bulgaria. Purpose is to help young physicists in their initial research in the field of HTS and related topics, and to support creation of the atmosphere of collaboration between physicists from NATO and Cooperative Partner countries. Aimed at scientists at the postdoctoral level with an appropriate scientific background. Subjects include: electronic structure of novel superconductors and related materials, Fermi surface mapping by angle-resolved photoemission, d-wave superconductivity, application of Eliashberg theory, and anomalous normal-state properties of HTS. Special attention will be paid to classical problems in the physics of superconductivity: Ginzburg-Landau and London theories and their application to theory of plasma waves in superconducting systems, surface phase transitions, hydrodynamic relations for superconductors, dynamics and pinning of vortices in HTS, electrostatics, magnetic susceptibility, optical properties, tunneling, fluctuation phenomena in superconductors. Will also include phenomenology of superconductivity: practical applications, superconducting field effect transistors, electric field effects in superconductors, and grain boundary and other material effects. **Application deadline, May 30, 1998.** For information, contact T. Mishonov, Dept. of Theoretical Physics, Faculty of Physics, University of Sofia, 5 J. Bourchier Blvd., 1164 Sofia, Bulgaria; phone +359 2 256 96 652; fax +359 2 96 252 76; e-mail mishonov@rose.phys.uni-sofia.bg.

Sept. 19 - 20, 1998: Third Canadian Applied Superconductivity Workshop (CASW '98), University of British Columbia, Vancouver, BC, Canada. Workshop is designed for researchers from industry, universities, and the government working with superconductivity. Emphasis will be on applications that are relevant to Canadian industry, which covers a broad range. Intended as a way to discuss research opportunities for HTS in electronics, microwave, and power applications. Several invited talks are planned to provide a world view of the superconducting industry and, more specifically, to the niche markets targeted by Canadian industry. Areas of interest include: fundamental microwave properties of HTS materials, growth and processing of HTS thin films, SQUID-based applications, fundamentals of active superconducting devices, power applications of HTS, bulk material processing, cryocoolers, and cryogenic packaging. For further information, contact Mike Denhoff, National Research Council of Canada; telephone (613) 993-4042; telefax (613) 952-5711; e-mail denhoff@nrcphy1.phy.nrc.ca; Web site <http://hts.ims.nrc.ca/casw>.

***Nov. 16 - 19, 1998:** 11th International Symposium on Superconductivity (ISS'98), Fukuoka Sunpalace Hotel, Fukuoka, Japan. Organized by the International Superconductivity Technology Center (ISTEC). Symposium will consist of oral and poster sessions and invited talks in the following topics: Physics – theory, physical properties, and new measurement techniques; Chemistry – new materials and syntheses, substitution, solid-state chemistry, and properties; Critical Current – flux-pinning mechanism, vortex physics, and weak links; Wires, Tapes, and Bulk – solid-state powder ceramics, chemical-solution processing, melting solidification, and chemical-vapor deposition; Films and Junctions – processing, properties, lithography, junction fabrication, and physics; Device Applications – digital, analog, SQUID, and other electronic devices; System Applications – power, power transportation, magnets, magnetic shields, and other system applications; and Standardization – standardization for electromagnetic, mechanical, and microwave properties measurements. Will also include exhibition of materials and devices. **Abstract deadline, June 30, 1998; exhibit application deadline, July 31, 1998.** Proceedings to be published. Official language is English. For further information, contact ISS'98 Secretariat, ISTEC, Eishin Kaihatsu Bldg. 6F, 34-3 Shimbashi 5-chome, Minato-ku, Tokyo 105-0004, Japan; telephone +81 3 3431-4002; telefax +81 3 3431-4044.

March 23 - 25, 1999: International Conference on Electric Railway Systems, Berlin, Germany. Organized by the Energietechnische Gesellschaft Society of the VDE. Conference will consist of the following main topics: system aspects of electric railway systems, rolling stock, traction power supply, signaling, control

technology and telematics, magnetic levitation technology, and environmental compatibility. **Abstract deadline, May 30, 1998.** Conference languages are English and German; simultaneous translation will be provided from German to English. For information, contact Verkehrinitiative, Neuer Adler e.V., Dipl. Ing. Gerhard Scholtis, Stephanstrasse 49, D-90478 Nürnberg, Germany; telephone +49 911 947 2351; telefax +49 911 947 3351; e-mail fischer@logistik.uni-erlangen.de.

FYI

(*High-T_C Update* takes no responsibility for want ads listed in this section.)

Position Available: A postdoctoral research associate position is available at the Oak Ridge National Laboratory (ORNL), Oak Ridge, Tennessee. Candidates must have a strong background in chemistry, ceramics, and/or materials science for study of the growth of epitaxial high-T_C superconductors using metal-organic precursor routes. Primary focus is on the development of YBCO-based coated conductors on RABiTS (Rolling-Assisted Biaxially Textured Substrates) using a non-vacuum process. Work also involves development of suitable buffer layers for YBCO superconductors. Experience in the growth of oxide thin films and characterizations is preferred. Ph.D. in chemistry, ceramics, or materials science required. Salary: \$40-45 K with benefits, depending on the experience. Position open to U.S. citizens and those with authorization for employment in the United States. **Application deadline, May 15, 1998.** Send CV along with the names of two referees to M. Paranthaman, Chemical and Analytical Sciences Division, Oak Ridge National Laboratory, Building 4500 South, MS-6100, Oak Ridge, TN 37381-6100; telephone (423) 574-5045; telefax (423) 574-4939; e-mail p11@ornl.gov.

Position Available: Applications are invited for a postdoctoral position, expected to start as early as June 1, 1998. Initial appointment will be for one year, with continuation for additional years conditional upon funding and mutual consent. The primary emphasis will be on fabrication and measurements on three-dimensional junction arrays. The fabrication will require substantial nanofabrication work at the Cornell Nanofabrication Facility and at PlasmaQuest, Inc., and candidates with some expertise in this area are preferred. Send a current CV and two letters of recommendation to R. S. Newrock, Department of Physics, University of Cincinnati, Cincinnati, OH 45221-0011; telephone (513) 556-0507; telefax (513) 556 3425; e-mail richard.newrock@uc.edu; additional information available at the Web site <http://xxx.lanl.gov>.



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High-T_c Update is the high-T_c superconductivity information exchange newsletter. It is available twice-monthly as hard copy and as electronic mail. Please send: 1) preprints, reprints, and other T_c-related reports or publications; 2) descriptions of on-going work; 3) meeting news; and 4) etc. Information in *High-T_c Update* is intended for limited distribution. Readers are expected to respect the rights of authors.