56TH ANNUAL CONFERENCE ON MAGNETISM AND MAGNETIC MATERIALS

30 October–3 November 2011
Scottsdale, AZ

ABSTRACTS

MMM 2011
Scottsdale, Arizona

dynamic nature of the fluctuations is not important and the quasi-particle dispersion exhibits the shadow feature like that induced by a static long range order. At lower energies, however, the shadow feature is pushed away by the finite ωb. The detailed low energy features are determined by the bare dispersion and the coupling of quasi-particles to the dynamic fluctuations. We present how these factors reconstruct the Fermi surface to produce the Fermi arcs or the Fermi pockets, or their coexistence. Our principal result is that the dynamic nature of the fluctuations, without invoking a yet-to-be-established long range order, can produce the Fermi pocket centered away from the (π/2,π/2) towards the zone center which may coexist with the Fermi arcs. This is discussed in comparison with the experimental observations.

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CP-05. A study on the extensive nano-twinning obtained in YBa2Cu3O7-δ Superconductors fabricated by Preform Optimized Infiltration Growth Process. *D.N. Kumar*[1], M.P. Swarup Raju[1] and S. Vummethala[1] *1. School of Physics, University of Hyderabad, Hyderabad, Andhra Pradesh, India*

High temperature superconductors in bulk form can have a wide range of technological applications as fault current limiters, permanent magnets, flywheel etc. [1, 2]. Bulk YBCO superconductors with high current densities (Jc) maintained to very large magnetic fields, with Jc in excess of 1 kAcm-2 up to fields of 6.5 Tesla at 77 K, have been fabricated employing Preform Optimized Infiltration Growth Process (POIGP) [3]. The final products were found to be free from major macro-defects like shrinkage, pores and cracks. The sample made under optimized conditions showed superior microstructures and Jc(H). A homogeneous distribution of Y-211 inclusions in the matrix of Y-123 was observed causing uniform Jc(H) across the volume of the samples [3]. Extensive twinning on a nano-scale (with twin widths ~ 40-100 nm) was observed in the samples [4]. Crossing twins were observed in the regions where Y-211 particles were in close proximity (FIG.1). In the regions where Y-211 particles were well separated, no crossing twins were observed. The lattice mismatch effects at Y-211/Y-123 interfaces affecting the widths of the twins in the proximity of Y-211 particles were observed. A detailed study is carried out in understanding the origin of these nano-twins in the present samples. The twin widths are measured and are correlated to the twin boundary energies following the twin shape method as suggested by Boyko et al. [5]. The role of twins and twin boundaries affecting Jc(H) at high fields are discussed.

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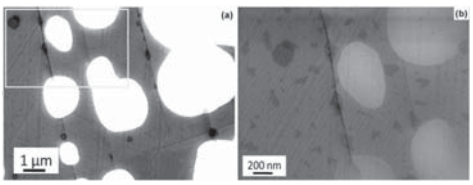

FIG. 1. Micrographs obtained from a YBCO superconductor at different magnifications (a) 25kX and (b) 50 kX using a Field Emission Scanning Electron Microscope. Presence of nano-twins and crossing-twins in the sample can be seen.

CP-06. Temperature-dependent Raman scattering of double perovskite Ba2FeReO6 and Sr2CrReO6. *A.F. García-Flores*[1], U.F. Kaneko[1], E. Granado[1] and J. Gopalakrishnan[2,3] *1. Instituto de Física "Gleb Wataghin," Universidade Estadual de Campinas, Campinas, SP, Brazil; 2. Center for Superconductivity Research, University of Maryland, Maryland, MD; 3. Solid State and Structural Chemistry Unit, Indian Institute of Science, Bangalore, India*

Raman scattering measurements on polycrystalline double perovskite Ba2FeReO6 and Sr2CrReO6 over a wide temperature range from 17 to 475 K, and from 30 to 730 K, respectively, were performed. Ba2FeReO6 compound is an interesting material due to its half metallicity, large room temperature magnetoresistance, high Curie temperature of TC ~305 K, and large spin polarization [1,2]. The crystallographic structure of this metallic compound presents cubic symmetry (space group Fm3m) at room temperature where the Fe3+(3d5) and Re5+(4d2) orbitals are in alternating FeO6 and ReO6 octahedra [2,3]. Sr2CrReO6 has a high Curie temperature (TC = 635K). The crystal symmetry is tetragonal I4/mmm at room temperature [4]. The Raman spectra for Ba2FeReO6 showed three Raman active modes out of four at around 396, 497, and 582 cm-1. From temperature dependence of the Raman spectra, we observed a remarkable response of the phonon mode, associated to stretching vibration modes of the BO6 octahedra, at 582 cm-1 to the onset of the magnetic ordering phase at TC = 305 K, where the mode frequency hardens anomalously with decreasing temperature below TC. Interestingly, the phonon mode at 615 cm-1 of Sr2CrReO6, associated to stretching vibration modes, also presented an anomalous hardening below TC. This anomalous deviation of the phonon frequency for both double perovskites can be understood in terms of spin-phonon coupling mechanism.

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CP-07. Structural and magnetic phase transition of mixed olivines $Li_xFe_{1-y}Ni_yPO_4$ by lithium deintercalation. *I. Lee*[1], C. Kim[1], S. Kim[1] and C. Kim[1] *1. Department of Physics, Kookmin University, Seoul, Korea, Republic of*

The structural and magnetic phase transition for $Li_xFe_{1-y}Ni_yPO_4$ has been investigated by the x-ray diffraction measurement and Mössbauer spectroscopy. Stoichiometric $Li_xFe_{1-y}Ni_yPO_4$ ($0.0 \le y \le 0.6$) polycrystalline powders were synthesized by the solid-state reaction method. Chemical oxidation to prepare the fully lithium deintercalated $Fe_{1-y}Ni_yPO_4$ ($0.0 \le y \le 0.6$) was performed by reaction of $Li_xFe_{1-y}Ni_yPO_4$ and NO_2BF_4 in acetonitrile [1]. Rietveld refinement of x-ray diffraction patterns of $Li_xFe_{1-y}Ni_yPO_4$ ($0.0 \le y \le 0.6$) revealed that the lattice parameter of a_0=10.328, b_0=6.007, and c_0=4.692 Å for $LiFePO_4$ linearly changed to a_0=10.154, b_0=5.923, and c_0=4.687 Å for $LiFe_{0.4}Ni_{0.6}PO_4$ by the substitution of Ni ions. Also, the fully lithium deintercalated $Fe_{1-y}Ni_yPO_4$ ($0.0 \le y \le 0.6$) series has same behavior of the change in lattice parameter with decrease of the unit cell volume by the lithium ion deintercalation. According to the temperature dependent magnetic susceptibility curves, the $Li_xFe_{1-y}Ni_yPO_4$ has an antiferromagnetic order with decrease of the magnetic Nèel temperature (T_N) from 51 K for $LiFePO_4$ to 36 K for $LiFe_{0.4}Ni_{0.6}PO_4$. Also, the magnetic order of fully deintercalated $Fe_{1-y}Ni_yPO_4$ ($0.0 \le y \le 0.6$) has different antiferromagnetic order with decrease in T_N from 114 K for $FePO_4$ to 62 K for $Fe_{0.4}Ni_{0.6}PO_4$ which coming from the spin-transition of Fe^{2+}/Fe^{3+} and Ni^{2+}/Ni^{3+} due to the lithium ion vacancy in olivine structure. The Mössbauer spectra below T_N for $Li_xFe_{1-y}Ni_yPO_4$ (x=0, 1, $0.0 \le y \le 0.6$) were fitted with asymmetrical eight Lorentzian. The electric quadrupole splitting value (ΔE_Q) of $Li_xFe_{1-y}Ni_yPO_4$ ($0.0 \le y \le 0.6$) increases while $Fe_{1-y}Ni_yPO_4$ ($0.0 \le y \le 0.6$) decreases with increasing Ni substitution. This can be explained by the concentration of Ni and Li ion can be affect on the charge distribution FeO_6 octahedral site.

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CP-08. Photo carrier induced effects on the magnetic ground state of La(2)CuO(4). *A. Suter*[1], E. Morenzoni[1], T. Prokscha[1], Z. Salman[1], B.M. Wojek[2,1], E. Stilp[2,1], S. Das[3], C. Bernhard[3], G. Logvenov[4,5], A. Gozar[4] and I. Bozovic[4] *1. Laboratory for Muon Spin Spectroscopy, Paul Scherrer Institut, Villigen PSI, Switzerland; 2. Physik-Institut, Universität Zürich, Zürich, Switzerland; 3. Physics Department, University of Fribourg, Fribourg, Switzerland; 4. Brookhaven National Laboratory, Upton, NY; 5. Max-Planck-Institut für Festkörperforschung, Stuttgart, Germany*

The undoped mother compounds of the cuprate based high temperature superconductors are charge-transfer insulators (CTI) with a band gap of