61ST ANNUAL CONFERENCE ON MAGNETISM AND MAGNETIC MATERIALS

NEW ORLEANS, LOUISIANA | OCTOBER 31 – NOVEMBER 4, 2016

ABSTRACTS

MMM 2016 New Orleans op. 61

AIP Publishing

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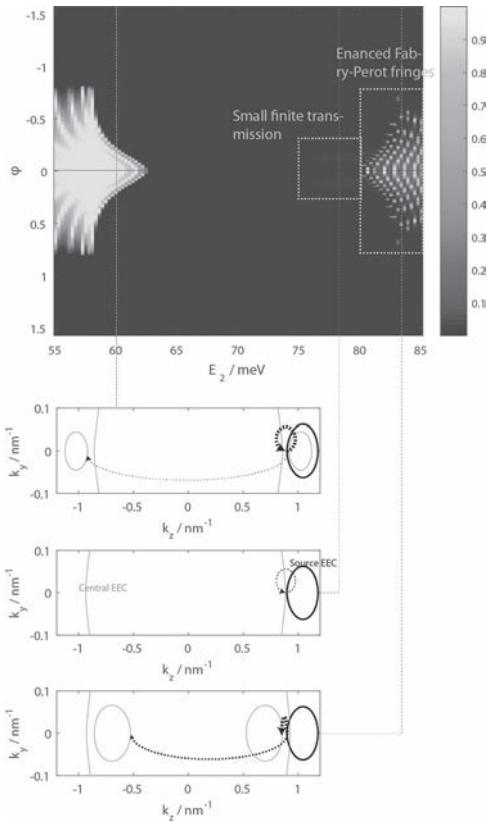

Fig. 2 The main plot shows the transmission as a function of incidence angle ϕ and E_2=E_f+U. The subplots show the source and central segment EECs at the indicated energy values. The thickness of the dotted arrows linking the source and central EECs indicate the relative weightages of the central states transmitted from the source.

BS-09. Crystal structure and magnetic properties of $Li_{1-x}Na_xFePO_4$ Investigated with Mössbauer Spectroscopy. *B. Ko*[1], H. Choi[1], T. Kouh[1] and C. Kim[1] *1. Department of Phsics, Kookmin University, Seoul, The Republic of Korea*

Byung Ug Ko[1], Hyunkyung Choi[1], Taejoon Kouh[1] and Chul Sung Kim[1]* [1]*Department of Physics, Kookmin University, Seoul, 02707, South Korea *e-mail: cskim@kookmin.ac.kr* We have synthesized the secondary battery cathode material, $Li_{1-x}Na_xFePO_4$ (x = 0, 0.01, 0.05, 0.1, 1.0) by solid state method and investigated with x-ray diffractometer (XRD), vibrating sample magnetometer (VSM) and Mössbauer spectrometer. The XRD patterns of synthesized $Li_{1-x}Na_xFePO_4$ (x =0, 0.01, 0.05, 0.1, 1.0) samples, which were analyzed by Rietveld refinement method using the Fullprof program, revealed the orthorhombic stucture with the space group *P*nma. The lattice constants were determined to be a_0 = 10.322 Å, b_0 = 6.005 Å and c_0 = 4.692 Å for $LiFePO_4$ and a_0 = 10.333 Å, b_0 = 6.012 Å and c_0 = 4.701 Å for $Li_{0.9}Na_{0.1}FePO_4$. The lattice constants a_0, b_0 and c_0 increased with the increasing Na contents. In order to determine the Néel temperature (T_N) and spin reorientation temperature (T_S), we measured the VSM and Mössbauer spectra at various temperature from 4.2 to 300 K. The values of T_N and T_S decreased from T_N = 51 K and T_S = 23 K for $LiFePO_4$ to T_N = 49.5 K and T_S = 20 K for $Li_{0.9}Na_{0.1}FePO_4$ with increasing Na contents. We expects decreasing interaction between ions with Na contents since Na-doping leads to larger separation between ions, as shown in the XRD analysis. The temperature-dependent Mössbauer spectra were analyzed by a set of eight lines below T_N and a doublet above T_N. At 4.2 K, the magnetic hyperfine field (H_{hf}), electric quadrupole splitting (ΔE_Q) and isomer shift (δ) values were determined to be H_{hf} = 124.5 kOe, ΔE_Q = 2.78 mm/s, δ = 1.24 mm/s. θ = 0.0°, ϕ = 0.0°, η = 0.77 and R = 3.29 for $LiFePO_4$ and H_{hf} = 165.9 kOe, ΔE_Q = 2.25 mm/s, δ = 1.23 mm/s. θ = 15.0°, ϕ = 10.0°, η = 0.40 and R = 2.83 for $NaFePO_4$.

[1] J. Wang and X. Sun, Energy Environ. Sci., 8, 1110 (2015).

BS-10. Pressure Induced Quantum Phase Transition in the Itinerant Ferromagnet UCoGa. *M. Míšek*[1], P. Opletal[2], J. Kaštil[1], J. Kamarád[1] and V. Sechovsky[2] *1. Department of Magnetics and Superconductors, Institute of Physics, Academy of Sciences of the Czech Republic, Prague, Czech Republic; 2. Department of Condensed Matter Physics, Faculty of Mathematics and Physics, Charles University, Prague, Czech Republic*

In recent years, the investigation of the critical behavior of itinerant ferromagnets has enjoyed a renewed interest, sparked by the observation of many unusual phenomena (anomalous non-Fermi liquid behavior, magnetically mediated cooper pairing, etc.) in the vicinity of disappearance of the long-range order induced by the variation of non-thermal "tuning parameter", such as the chemical doping or hydrostatic pressure. Particularly, the pressure evolution of the ferromagnet to paramagnet transition at low temperatures has been discussed within different scenarios, where a quantum phase transition may take place. In the clean systems at low temperatures, there are two possible scenarios: Either a first-order ferromagnetic to paramagnetic transition, or the appearance of an inhomogeneous magnetic phase between the ferromagnetic and paramagnetic state. There are only few known U-based ferromagnetic compounds displaying the change of the order of transition, demonstrating the appearance of the first order transition by driving the system close to the loss of the long range magnetic order. Here we report the evolution of the ferromagnetic order of the UCoGa with the application of the hydrostatic pressure. Experiments were performed on a piece of high quality single crystal grown by the Czochralski method and carefully characterized at ambient pressure. The behavior under high pressures has been studied by magnetization, resistivity and Hall effect measurements, utilizing a diamond anvil cells to generate the hydrostatic pressures up to ~ 8 GPa. We mapped out the P-T phase diagram, confirming the change of the transition type from 2nd (T_C = 48 K at ambient pressure [1]) to 1st order with a tricritical point at P ~ 6 GPa and T ~ 15K, clearly demonstrated by the appearance of the metamagnetic wings in pressures above P_C. The observed pressure-induced QPT is compared with those observed in related isostructural hexagonal UTX compounds, in particular the URhAl [2]. The above mentioned scenarios for the observed QPT in UCoGa are discussed.

[1] Nakotte, F. R. de Boer, L. Havela, P. Svoboda, V. Sechovsky, Y. Kergadallan, J. C. Spirlet, and J. Rebizant, J. Appl. Phys. 73, 6554 (1993). [2] Y. Shimizu, D. Braithwaite, B. Salce, T. Combier, D. Aoki, E. N. Hering, S. M. Ramos, J. Flouquet, Phys. Rev. B 91, 125115 (2015)

BS-11. Withdrawn

BS-12. Electron Spin Resonance of Gd^{3+} Ions in $Gd_xY_{1-x}Ni_3Ga_9$ ($0.05 \leq x \leq 1.00$). J.G. Duque[1,2], E.C. Mendonça[2], L.S. Silva[2], C.B. Jesus[1], *P. Pagliuso*[1] and R. Lora-Serrano[3] *1. DEQ, Instituto de Física Gleb Wataghin - Unicamp, Campinas, Brazil; 2. Physics, Programa de Pós-Graduação em Física, Campus Prof. José Aluísio de Campos, UFS, 49100-000 São Cristóvão, SE, Brazil, São Cristóvão, Brazil; 3. Physics, Universidade Federal de Uberlândia, 38408-100, Uberlândia, MG, Brazil, Uberlândia, Brazil*

The series of Gd-based intermetallic compounds are usually interesting pure-spin systems to explore the interplay between Ruderman-Kittel-Kasuya-Yoshida (RKKY) magnetic interaction and Fermi surface effects in complex materials. In this sense, the local environment of Gd^{3+} $4f^7$ (S = 7/2) ions in $Gd_xY_{1-x}Ni_3Ga_9$ ($0.05 \leq x \leq 1.00$) is investigated by means of electron spin resonance (ESR). Supplementary magnetization and specific heat measurements are also used to probe the effect of the Y-doping. Single crystalline samples were grown by the metallic flux method using Ga in excess. These materials crystallize in a trigonal $ErNi_3Al_9$-type structure with space