O-01 **Tue. 01. 09., 11^{40}-12^{00}**

Momentum dependence of a Kondo resonance in $Ce_2Co_{0.8}Si_{3.2}$

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Keywords: Kondo resonance, angle-resolved photoemission spectroscopy, cerium intermetallics

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$Ce_2Co_{0.8}Si_{3.2}$ is a Kondo lattice system with the Kondo and coherence temperatures equal 50 K and 80 K, respectively. It crystallizes in a hexagonal structure, which is a derivative of the AlB_2 type. The system remains nonmagnetic down to 0.4 K and shows increased electronic specific heat, which amounts to C/T=200 $mJ/(mole_{Ce}\ K^2)$ at low temperature (0.4 K). An evidence of Griffiths phases was found in $Ce_2Co_{0.8}Si_{3.2}$ below 10 K and is attributed to a disorder in the Co-Si sublattice.

Band structure of $Ce_2Co_{0.8}Si_{3.2}$ was studied by means of angle-resolved photoemission spectroscopy (ARPES) at the APE beamline located at Elettra synchrotron [2]. The data were collected at temperature of 25 K with photon energies of 25 eV and 40 eV, which correspond, respectively to a low and high photoionization cross section for Ce 4f electrons. The studies with 40 eV revealed a Kondo peak ($f_{5/2}^1$ final state) and its spin-orbit partner ($f_{7/2}^1$ final state). Two bands crossing Fermi energy were found in the experiment, one of them has parabolic dispersion and is considered as a surface state. The second one forms an electron pocket in the Γ point.

Band structure of stoichiometric Ce_2CoSi_3 was calculated with full-potential local-orbital (FPLO) code. The dispersions from ARPES, which are attributed to bulk states were found in the calculations.

The Kondo peak is nondispersing at T = 25 K but its intensity varies considerably with momentum. Its maximum of the intensity corresponds to a Fermi vector of the band found in the FPLO calculations, a dispersion of which was not revealed by ARPES. For the other Fermi vectors Kondo resonance is of moderate or lower intensity. The variation of a Kondo peak intensity along a Fermi surface is in line with the theory predicting a strong anisotropy of hybridization between f-electrons and conduction band (V_{cf}) [3-5].

Acknowledgments: This work has been supported by the Ministry of Science and Higher Education in Poland within the Grant no. N N202 201 039. A part of the measurements was carried out with the equipment purchased thanks to the European Regional Development Fund in the framework of the Polish Innovation Economy Operational Program (contract no. POIG.02.01.00-12-023/08).

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