

Electronic properties of (Ce,La)Pd₂(Al,Ga)₂ Compounds

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The tetragonal CeT₂X₂ compounds, where $T = \text{d-metal}$ and $X = \text{p-metal}$, form a large family of intermetallics with a variety of physical properties. Heavy-fermion behavior, valence-fluctuations, non-Fermi-liquid behavior, or superconductivity are the examples of highly interesting properties of these compounds. Their properties are influenced by competition between RKKY and Kondo interaction as well as by crystal electric field. Moreover, a strong electron-phonon (e-p) interaction was observed as an additional peak in energy spectra of CePd₂Al₂ recently [1].

Presented study is focused on (Ce,La)Pd₂Al_{2-x}Ga_x compounds investigated by means of magnetization, electrical resistivity and powder neutron diffraction measurements. The electronic and structural properties of these Ce-based compounds are discussed with respect to the strength of e-p interaction. La counterparts then undergo the superconducting transition at low temperatures. The superconductivity is not the conventional one as there are significant deviations from BCS theory predictions.

References:

[1] L.C. Chapon, E.A. Goremychkin, et al., Physica B 378-380, 819 (2006).