

MS44-P06**Low temperature X-ray investigations using a Guinier diffractometer system**Michael Tovar¹, Galina Gurieva¹, Susan Schorr²

1. Helmholtz-Zentrum Berlin, Berlin, Germany
2. Helmholtz-Zentrum Berlin / Freie Universität Berlin, Berlin, Germany)

email: tovar@helmholtz-berlin.de

Using a Guinier diffractometer for low temperature X-ray diffraction allows accurate investigations of lattice parameters at non-ambient conditions. Therefore, we are able to trace subtle changes in cell metrics such as cell parameter deviations or symmetry breaking. In this contribution, we will apply this technique particularly to kesterite-type solar absorber materials. For Kesterite-type materials unusual thermal behaviour like negative thermal expansion is reported (1). Measurements from 10 to 300 K were collected. Description of the instrument and outcome of low temperature X-ray investigations will be presented and compared to formerly results.



References:

- (1) Schorr, S., Sheptyakov, D., J. Phys.: Condens. Matter 20 (2008), 104245

Keywords: Low temperature, Guinier, Phase transition

MS44-P07**Structural Properties of (Ce,La)Pd₂Al_{2-x}Ga_x Compounds**Petr Doležal¹, Dominik Kriegner¹, Milan Klicpera¹, Alexandra Rudajevová¹, Jiří Prchal¹, Pavel Javorský¹

1. Department of Condensed Matter Physics, Faculty of Mathematics and Physics, Charles University, Prague, Czech Republic

email: petr284@seznam.cz

(Ce,La)Pd₂(Al,Ga)₂ are intermetallic compounds with a tetragonal CaBe₂Ge₂ structure type at room temperature. This structural type is very common in intermetallic compounds with a 1:2:2 stoichiometry. The studied compounds undergo a structural phase transition at low temperatures. The low temperature structure of CePd₂Al₂ is orthorhombic (*Cmme*) below 13.5 K [1] and CePd₂Ga₂ is triclinic below 125 K [2]. Similar structural behaviour is observed in their non-magnetic La analogues. It is not known what causes the different behaviour of CePd₂Al₂ and CePd₂Ga₂ compounds at low temperatures considering the room temperature structure is similar for both compounds. The CePd₂Al₂ is also one of the rare examples of Ce-based compounds whose magnetic excitations in crystal electric field does not fulfil the scheme based on a tetragonal point symmetry of the Ce ion [1].

In the presented study we focus in more detail on the structural properties of the (Ce,La)Pd₂Al_{2-x}Ga_x series using the low temperature X-ray powder diffraction. These results are also compared with inelastic neutron spectra, which shows the behaviour of magnetic excitations in this series. We found that specific Ga concentration leads to the suppression of the transition temperature in the CePd₂Al_{2-x}Ga_x series. We also studied the structural transition on CePd₂Al₂ and LaPd₂Al₂ single crystals which were prepared by using the Czochralski method.

References:

- [1] Chapon L. C. & Goremychkin E. A. & Osborn R. & Rainford B. D. & Short S. (2006). Physica B. 378-380. 819-820.
- [2] Kitagawa J. & Ishikawa M. (1999). Journal of the Physical Society of Japan. 68. 2380-2383.

Keywords: low temperature structure, structural phase transition