Experiment Report HC-4363

Investigation on structural changes in Eu_2Pd_2Sn

In the novel non-centrosymmetric orthorhombic compound Eu_2Pd_2Sn, the Eu^{2+} magnetic substructure forms 2D-puckered layers stacked along the *b*-axis. This proposal aimed to perform a very accurate structural analysis at low temperatures of Eu_2Pd_2Sn in order to understand the origin of a soft-phonon like excitation at around 25K observed in specific heat measurements. In particular, by this analysis we wanted to check if around that temperature a progressive change of structure between the high temperature orthorhombic and the suspected low temperature monoclinic polymorph occurs.

We collected high resolution X-ray diffraction data between 5 and 300 K at selected temperature; these data were used to carry out Rietveld refinements (Figure 1) in order to determine the thermal dependence of the crystal structure and the microstructure as well.

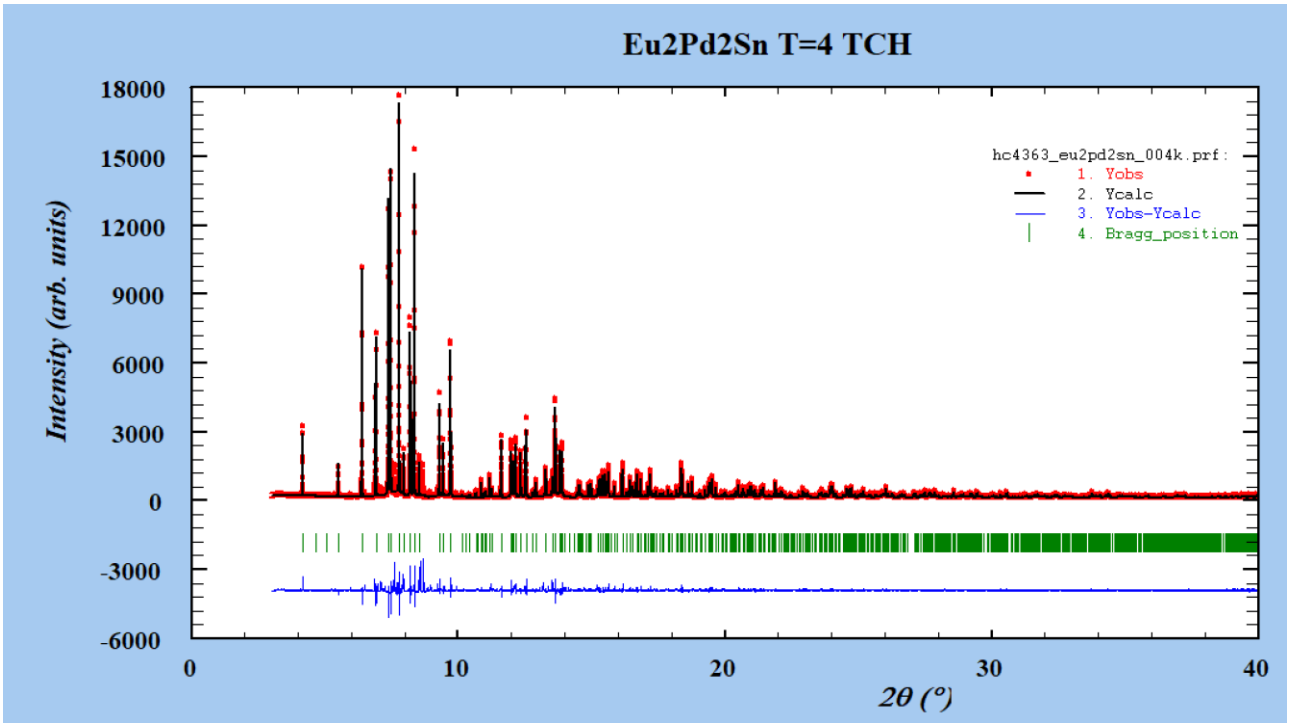

Figure 1: Rietveld refinement plot obtained by applying the orthorhombic *Fdd*2 crystal structure model (synchrotron XRPD data collected at 4 K). The error that appears from the difference curve can be ascribed to a secondary (and still not identified) phase.

As a result, no structural transition can be detected down to 4 K, neither the thermal dependence of microstructural properties give hints about this. So we concluded that Eu_2Pd_2Sn retains the orthorhombic *Fdd*2 crystal structure in the whole inspected 4 – 300 K thermal range.