

Studies of indium influence on transport properties of partially filled $\text{In}_x\text{Co}_4\text{Sb}_{12}$

Leszczynski J.¹, Da Ros V.¹, Lenoir B.¹, Dauscher A.¹, Candolfi C.¹, Masschelein P.¹,
Bellouard C.², Stiewe C.³, Müller E.³, Hejtmanek J.⁴

1-Laboratoire de Physique des Matériaux, UMR 7556, Nancy Université - CNRS, Ecole Nationale Supérieure des Mines de Nancy, Parc de Saurupt, 54042 Nancy cedex, France

2-Laboratoire de Physique des Matériaux, UMR 7556, Université Henri Poincaré, B.P. 239, 54506 Vandoeuvre-les-Nancy Cedex, France

3-German Aerospace Center DLR e.V., Institute of Materials Research, Linder Hoehe, 51147 Köln, Germany

4-Institute of Physics, Academy of Sciences of the Czech Republic, Cukrovarnicka 10, CZ-162 53, Praha 6, Czech Republic

Studies of partially filled n-type $\text{In}_x\text{Co}_4\text{Sb}_{12}$ skutterudite compounds has been recently reported showing interesting thermoelectric properties at moderate temperatures.

In this paper, we have focused our investigations on more detailed recognition of transport properties in $\text{In}_x\text{Co}_4\text{Sb}_{12}$. Polycrystalline samples of indium partially filled CoSb_3 have been prepared by a typical solid-state reaction. In order to recognize indium behaviour in skutterudite structural voids, neutron powder diffraction studies on a temperature range 4 – 300K have been carried out on selected samples preceded by a X-ray powder diffraction structural studies. Measurements of the electrical resistivity, thermoelectric power and thermal conductivity have been performed between 4 and 800 K. Hall carrier concentrations and mobilities have been determined from 4 to 350 K. The influence of the indium partial filling on the transport properties of $\text{In}_x\text{Co}_4\text{Sb}_{12}$ and correlation between determined structural parameters and thermal conductivity are presented and discussed.

E-mail Presenting Author : juliusz.leszczynski@mines.inpl-nancy.fr