

Summary of single crystal growth in filled skutterudite compounds

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In this project, we have prepared single crystalline samples of filled skutterudite and characterized the physical properties by means of electrical resistivity, magnetic susceptibility, specific heat, and de Haas-van Alphen (dHvA) effect. These high-quality single crystalline samples have been also provided to the other project members and investigated precisely by their own specialized experimental techniques, such as neutron diffraction, nuclear magnetic resonance (NMR), ultra sound, Raman scattering, photoemission spectroscopy etc. During this project we have newly succeeded in growing single crystals of ROs_4P_{12} (R =La, Ce, Pr, Nd)[1, 2], and RFe_4Sb_{12} (R =La, Ce, Pr, Sm)[3], farther, we have synthesized Ge-based skutterudite RPt_4Ge_{12} (R =Ba, Sr, La, Ce, Pr, Nd)[4], which was recently found by Bauer *et al.*[5] and Gumeniuk *et al.*[6] In this presentation, we will summarize the present status of single crystal growth in filled skutterudite compounds.

- [1] H. Sugawara, D. Kikuchi, H. Sato, R. Settai, T. Endo, and Y. Ōnuki, Physica B **403** (2008) 934.
- [2] Y. Iwahashi, H. Sugawara, K. Magishi, T. Saito, K. Koyama, R. Settai, Y. Ōnuki, G. Giester, and P. Rogl, J. Phys. Soc. Jpn. **77** (2008) Suppl. A, 219.
- [3] I. Mori, H. Sugawara, K. Magishi, T. Saito, K. Koyama, D. Kikuchi, K. Tanaka, and H. Sato, J. Magn. Magn. Mater. **310** (2007) 277.
- [4] M. Toda, H. Sugawara, K. Magishi, T. Saito, K. Koyama, Y. Aoki, and H. Sato, submitted.
- [5] E. Bauer, A. Grytsiv, Xing-Qiu Chen, N. Melnychenko-Koblyuk, G. Hilscher, H. Kalldarar, H. Michor, E. Royanian, G. Giester, M. Rotter, R. Podloucky and P. Rogl, Phys. Rev. Lett. **99** (2007) 217001.
- [6] R. Gumeniuk, W. Schnelle, H. Rosner, M. Nicklas, A. Leithe-Jasper and Yu. Grin, Phys. Rev. Lett. **100** (2008) 017002.