

Preparation of new intermetallic compounds in *f*-electron systems

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We report our recent activities on materials research in rare-earth, uranium and transuranium compounds. Among the crystal growth techniques, the flux method is widely used for the single crystal growth of intermetallic compounds of *f*-electron systems including skutterudite compounds. It has an advantage in growing actinide compounds, since only a little amount of starting material, typically less than 1 g, is sufficient to obtain a large single crystal.

We use this flux technique as well as conventional arc-melting and Bridgman technique to obtain intermetallic compounds. To characterize the samples, we employ electron-probe microanalyses and single-crystal x-ray diffraction for the determination of composition and crystal structure, respectively. Using these methods, we succeeded to identify several new compounds with new structure types such as U₃Ni₅Al₁₉[1], CePdSb₃[2], CeAu₄Si₂[3] and Ce₂IrSi₂Al₆[4].

Recently the single crystal x-ray diffraction is successfully applied for the neptunium compounds, where the typical dimension of the sample is less than 0.1 x 0.1 x 0.1 mm³. Our preliminary investigations showed that there exist several new compounds in the Np-Ga binary phase.

[1] Y. Haga *et al.*, Physica B **359-361** (2005) 1006.

[2] A. Thamizhavel *et al.*, J. Phys. Soc. Jpn. **74** (2005) 2617.

[3] H. Nakashima *et al.*, J. Alloys Compounds, to be published.

[4] Y. Haga *et al.*, to be published.