

Partial density of states for 3p orbitals of P in filled skutterudite compounds

N. Yamada¹, T. Iwazumi², K. Kuroki¹, J. Nakamura¹

1 - Department of Applied Physics and Chemistry, University of Electro-Communications,
Chofu-ga-oka, Chofu, Tokyo 182-8585, Japan

2 - Photon Factory, Institute of Materials Structure Science,
1-1 Oho, Tsukuba 305-0801, Japan

The filled skutterudite with a general formula RT_4X_{12} (R=Rare-Earth; T=Fe, Ru and Os; X=P, As and Sb) crystallizes in a BCC structure. The compounds recently attracted much attention from the variety of the electric and magnetic properties: metal-insulator transition, semiconductor, semi-metal, superconducting properties, ferro-magnetic transition, quadru-pole ordering, *et al.* The main character of the skutterudite compounds originates from the electronic properties of conduction band which are composed from p-orbitals of X(P, As and Sb), d-orbitals of T(Fe, Ru, and Os) and f-orbitals of R(Rare earth). In this study, we propose the experiments of measurement of x-ray absorption and emission spectroscopy on 3p-1s transition of P in compounds RT_4X_{12} to study the partial electronic density of 3p orbital states near Fermi surface. This proposal would present the information of partial electronic states of 3p orbital which is complimentary with the information on the total electronic density of states from XPS, ARPES and de Haas-van Alphen effect[1]. Figure 1 shows the experimental arrangement.

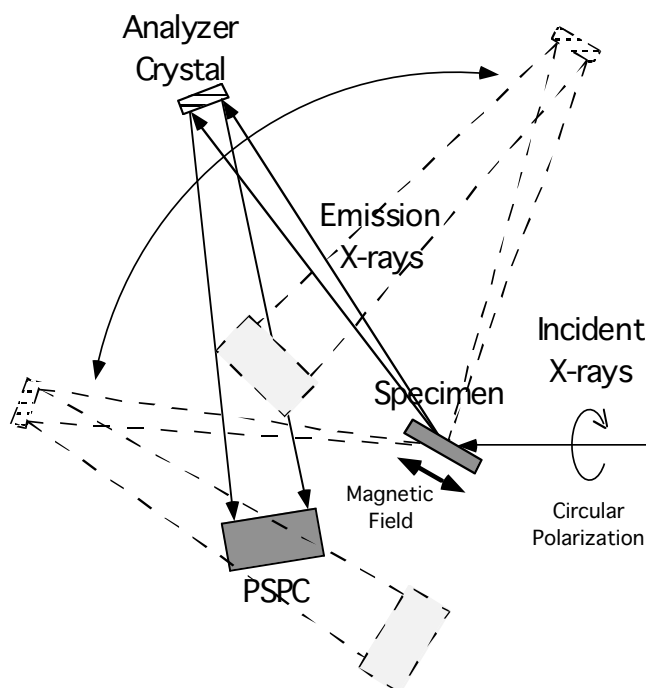


Fig. 1 Arrange of Experimental Equipment

[1] J. Nakamura, S. Nasubita, E. Kabasawa, H. Yamazaki, N. Yamada, et al., Phys. Rev. B **68** (2003) 064515(1-5).