2010/1/22: Neutron Program Advisory Committee

Program ID: 2009S05

Title: "Structural study of functional materials and development of advanced methodology using SuperHRPD"

Principal Investigator: Yukio Noda

Decision: continue

Beam allocation: β =60%

Approval and suggestion(s) to IMSS: budget and resources

The committee approves the continuation of this project. However, the budget for new detectors is not approved as long as the science that should be investigated with the highest resolution does not become clear.

Comments:

The purpose of this project is to study crystal structures of functional materials with the highest resolution in the world ($\Delta d/d = 0.3\%$) on the Super High Resolution Powder Diffractometer (SuperHRPD) installed at BL08.

First, the team transferred the Sirius diffractometer from KENS to start the structural studies. In FY2009, the S/N was improved by the installation of the new vacuum scattering chamber. The data analysis process such as the time focusing process and the data correction process was improved, also the development of the analysis software package Z-Code was continued. The experiments in this project were just started. This project was conducted as it is almost planed.

The resolution was confirmed to be 0.035% for a single crystal of silicon, and 0.1% for a powder sample by using all detectors. It was found to be 0.03% for a powder sample by using a limited number of detectors located near the back scattering region, however, the intensity was only 1/100 of that for the full detector system. By replacing the current detectors transferred from Sirius with high resolution detectors, the intensity will be improved. However, the science that should be investigated with the highest resolution is unclear. By demonstrating such an experiment first, the team should settle on the science with the highest resolutions.