

E0007

The Whole Particle Structural Analysis on TiO_2 and $\text{Ge}_2\text{Sb}_2\text{Te}_5$ Nanoparticles. S. Shamoto¹, K. Kodama¹, S. Iikubo¹, T. Taguchi¹, Th. Proffen², N. Yamada³, ¹Quantum Science Directorate, Japan Atomic Energy Agency, Tokai, Ibaraki, 319-1195 Japan, ²Los Alamos National Laboratory, Los Alamos, NM, 87545 USA, ³Matsushita Electric Industrial Co., Ltd., Moriguchi, Osaka, 570-8501 Japan.

A nanoparticle has large surface area in the ratio, which would have different crystal structure from the inside. As for a catalyst, the surface plays an important role in the functionality. Structural analysis of the whole particle is an important step toward understanding the property. Recent high intensity quantum beams, such as pulsed neutron and synchrotron x-ray provide us a possibility for the analysis, which needs high Q-resolution and high intensity simultaneously. TiO_2 and $\text{Ge}_2\text{Sb}_2\text{Te}_5$ nanoparticles are photocatalyst and optical recording materials, respectively. The former particles are isolated individually, while the latter particles are embedded in an amorphous matrix. These two typical nanoparticles have been studied by the atomic pair distribution function (PDF) analysis with the spherical particle form factor [1] using neutron powder diffraction data obtained at NPDF in LANSCE as shown in Fig. 1.

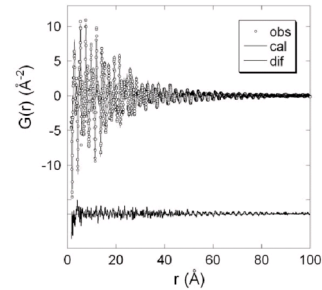


Figure 1. Observed, calculated and difference PDFs with the spherical particle form factor for TiO_2 nanoparticle.

[1] K. Kodama, S. Iikubo, S. Shamoto, cond-mat/0511246.