

Magnetic & Crystal Structure Studies with Neutron Diffraction

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Neutron diffraction is a very powerful experimental tool for studying magnetic and crystal structure in macroscopic point view. After refining the neutron diffraction diagrams, we can get the impotent structural information such as atomic position, lattice parameter, thermal motion, magnitude of spin, spin configuration etc. Especially, multiferroics system which is coexisted two order parameters as well as ferroelectricity and magnetism in one material is strong candidate for requiring the neutron diffraction studies. Neutron diffraction can be investigated the origin of multiferroric phenomena such as coupling mechanism between the ferroelectric and magnetism.

In this talk, I will present how we can refine the magnetic and crystal structure using neutron powder diffraction. This talk will be introduced the analyzing method to refine a neutron diffraction data with Fullprof program. For example, I will explain detail crystal and magnetic structure of multiferroric hexagonal manganite with neutron diffraction. According previous our neutron diffraction studies, the hexagonal manganites RMnO₃ undergo an iso-structural transition at magnetic transition temperature with unusually large atomic displacements: two orders of magnitude larger than those seen in any other ordinary materials, resulting in a uniquely strong magneto-elastic coupling.