

Some topics in structural change on magnetic order

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Magnetic order induces structural distortion as well as structure transition. Although the degree of distortion is sometime too small to be detected by ordinary resolution diffractometers, the studies of the distortion may result in new findings. We have been developing a high resolution neutron diffractometer, SuperHRPD, with the best resolution of $\Delta d/d = 0.035\%$ at the Material and Life science Facility (MLF) of J-PARC to detect small distortion and determine crystal and magnetic structures precisely. Until now, we have studied several topics of structural distortions/phase transitions which are induced by magnetic orders through magnetoelastic coupling: elinvar alloys whose elastic property is temperature independent, Co oxides which show negative thermal expansion [1], and transition mono oxides whose magnetoelastic couplings are different among them [2]. This work was supported by the S-type project of KEK (Proposal 2014S05).

1. Hole-doping-induced melting of spin-state ordering in PrBaCo₂O_{5.5+x}, Ping Miao, Xiaohuan Lin, Sanghyun Lee, Yoshihisa Ishikawa, Shuki Torii, Masao Yonemura, Tetsuro Ueno, Nobuhito Inami, Kanta Ono, Yinxia Wang, Takashi Kamiyama, arXiv:1602.05687

2. Novel magnetoelastic coupling forbidden by time-reversal symmetry: Spin-direction-dependent magnetoelastic coupling on MnO, CoO, and NiO, Sanghyun Lee, Yoshihisa Ishikawa, Ping Miao, Shuki Torii, Toru Ishigaki and Takashi Kamiyama, Phys. Rev. B 93, 064429 (2016).

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