Abstract Submitted
for the MAR16 Meeting of
The American Physical Society

Neutron diffraction study of 154SmFeAsO1-xDx SOSHI IIMURA, HIROSHI OKANISHI, Materials and Structures Laboratory, Tokyo Tech., SATORU MATSUISHI, Materials Research Center for Element Strategy, Tokyo Tech., HARUHIRO HIRAKA, KAZUTAKA IKEDA, Institute of Materials Structure Science, KEK, THOMAS HANSEN, Institut Laue-Langevin, TOSHIYA OTOMO, Institute of Materials Structure Science, KEK, HIDEO HOSONO, Materials and Structures Laboratory, Tokyo Tech. — Hot issue in unconventional superconductors (SC) is why the 2nd highest-Tc of 56 K after cuprates is accomplished in the 1111-type iron-oxyarsenides LnFeAsO1-xFx (Ln = lanthanide). Recently, utilizing a hydride-substitution-method (O2- = H- + e-) in the LnFeAsO1−xHx [1], we found a second SC phase in $0.18 \leq x \leq 0.45$ at Ln = La in addition to the first one adjacent to the antiferromagnetic (AFM) order [2], and another AFM order accompanying a unique structural transition in over-doped region $x > 0.4$ [3]. However, since the Tc of La-system is lower than the other systems, i.e., Ln = Ce, Sm and so on, it is still unclear whether the second AFM phase is essential for their high-Tc or not. Thus, we synthesized the isotope-substituted 154SmFeAsO1-xDx and performed neutron powder diffraction (NPD) to examine the structural and magnetic properties of the high-Tc 1111 system. In this talk, we show the results of NPD data and discuss the relation between the superconducting, magnetic, and structural properties of the 154SmFeAsO1-xDx and electron-doping-effect on it. [1] T. Hanna, et al. PRB 85, 024521 (2011). [2] S. Iimura, et al. Nat.Commun. 3, 943 (2012).
[3] M. Hiraishi et al. Nat. Phys. 10, 300 (2014).

SOSHI IIMURA
Tokyo Inst of Tech - Yokohama

Date submitted: 06 Nov 2015 Electronic form version 1.4