Magnetism of SmFeAsO\(_{1-x}\)F\(_x\)\(^1\) YOICHI KAMIHARA, Keio Univ., YASUHIRO KOBAYASHI, SHINJI KITAO, Kyoto Univ., YOSHITAKA YODA, JASRI, MAKOTO SETO, Kyoto Univ., HIDEO HOSONO, Tokyo Institute of Technology, JST TRIP COLLABORATION, JST CREST COLLABORATION — Magnetic properties of superconducting SmFeAsO\(_{1-x}\)F\(_x\) are demonstrated by \(^{57}\)Fe Mossbauer spectroscopy (MS) and \(^{149}\)Sm Nuclear resonant forward scattering (NRFS). Polycrystalline SmFeAsO\(_{1-x}\)F\(_x\) samples were synthesized using two-step solid state reaction described elsewhere. [New J. Phys. 12, 033005 (2010).] Purity of samples was checked by X-ray diffraction patterns using Cu K-alpha radiation. Resistivity and magnetization measurements, as well as by \(^{57}\)Fe MS and \(^{149}\)Sm NRFS spectroscopy, at various temperatures were performed to define superconducting, magnetic ordering temperatures. [Phys. Rev. B 78, 184512 (2008) & J. Phys. Soc. Japan 77, 103706 (2008).] A magnetic phase diagram we have proposed is closer to that by Hess et al [Europhys. Lett. 87, 17005 (2009).]; that is long-range AF ordering of Fe (a static magnetism) does not persist in the superconducting regime. Such a relation between spin dynamics and SC is a common feature among LnFeAsO\(_{1-x}\)F\(_x\) (Ln = La, Ce, Pr, Nd, and Sm). Our results indicate that the relation between the static magnetism and \(T_c\) of LnFeAsO\(_{1-x}\)F\(_x\) shows similar topology to that of copper-based high-Tc superconductors. [Phys. Rev. B 42, 7981 (1990).]

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Yoichi Kamihara
Keio Univ.

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