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High-Tc superconductivity and antiferromagnetism on self-doped high-Tc cuprate $Ba_2Ca_3Cu_4O_8F_2$ SUNAO SHIMIZU, HIDEKAZU MUKUDA, YOSHIO KITAOKA, Osaka University, AKIRA IYO, YASUHARU KODAMA, HIJIRI KITO, National Institute of Advanced Industrial Science and Technology, KAZUYASU TOKIWA, TSUNEO WATANABE, Tokyo University of Science — We report on the antiferromagnetism and high-Tc superconductivity in a F-substituted four-layered cuprate, composed of two outer and inner CuO_2planes in a unit cell, $Ba_2Ca_3Cu_4O_8F_2$. Although a formal Cu valence is expected to be just +2.0 in the nominal composition, this is not a half-filled Mott insulator but a superconductor with Tc = 55K. Recently, it has been suggested that the origin of the superconductivity in this compound is self-doping by ARPES measurement [1] and band calculation [2], which means either outer or inner CuO_2 planes are hole-doped, and the others are electron-doped. From F-NMR study, we have confirmed magnetic order with T_N = 100K, concluding the uniform mixing of superconductivity and magnetic order in a single CuO_2 plane. In addition, we have compared a three-layered compound $Ba_2Ca_2Cu_3O_6F_2$, which is also superconductor with Tc = 76K. We will introduce the unique magntic and superconducting phenomena in F-substituted cuprates from microscopic points of view. [1]Y. Chen, *et al.*, cond-mat/0611291 (2006) [2] W. Xie, et al., cond-mat/0607198 (2006)

Sunao Shimizu
Department of Materials Engineering Science,
Osaka University, Osaka 560-8531, Japan

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