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Giant magnetic coercivity and nano-domains in $Fe_{0.25}TaS_2$[1] Y.J. CHOI, WEIDA WU, S. PARK, Y. HORIBE, S.-W. CHEONG, Rutgers Center for Emergent Materials and Department of Physics and Astronomy, Rutgers University, Piscataway, NJ, 08854, USA, S.B. KIM, Laboratory of Pohang Emergent Materials and Department of Physics, Pohang University of Science and Technology - Pohang 790-784, South Korea, T. ASADA, Department, NISSAN ARC, LTD. - Yokosuka, Kanagawa 237-0061, Japan — We have explored giant magnetic coercivity ($H_c \sim$ 7 tesla) in the highly anisotropic ferromagnet of $Fe_{0.25}TaS_2$ through harnessing order of Fe^{2+} ions intercalated in-between TaS_2 layers. Fe ions order well in annealed crystals and form a (1/2,0,0) superlattice. However, a (1/3,1/3,0) superlattice, in addition to the (1/2,0,0) superlattice, can form in quenched crystals. These coexisting superlattices with nano-size domains result in significant change of zero-field-cooled magnetic domain configurations and huge enhancement of H_c, probably through efficient magnetic domain wall pinning by nano-size superlattice domains.[2]

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[2]Y.J. Choi, et al, EuroPhys. Lett., 86, 37012 (2009).

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