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Unusual phase transition in a natural heterostructure of iron pnictides and vanadium oxides JONG MOK OK, POSTECH, S.-H. BAEK[1], IFW Dresden, MAN JIN EOM, POSTECH, C. HOCH, R. K. KREMER, Max-Planck-Institut für Festkörperforschung, DONG-HWAN KIM, POSTECH, CHUN-FU CHANG, KYUNG-TAE KO, Max-Planck-Institut für Chemische Physik fester Stoffe, SANG-YOUN PARK, SUNG DAE JI, POSTECH, B. BÜCHNER, IFW Dresden, JAE-HOON PARK, J. H. SHIM, POSTECH, I. I. MAZIN, Naval Research Laboratory, JUN SUNG KIM[2], POSTECH — We report the unusual phase transition in Sr_2VO_3FeAs single crystal, where the Mott-insulating vanadium oxides and the high-T_c superconducting iron pnictides form a natural heterostructure. Clear evidence of the phase transition at $T_0 = 155$ K was observed in the iron pnictide layer, not in the vanadium oxide layer, using bulk and NMR measurements. Neither magnetic ordering with sufficient spin moment nor symmetry change in the crystal structure has been detected at T_0. At $T_{mag} \approx 45$ K, far below T_0, magnetic transition occurs in the iron pnictide layer, while the vanadium oxide layer remains nonmagnetic at low temperatures. The complex evolution of various phases in Sr_2VO_3FeAs is drastically distinct from the phase transitions found in other iron pnictides or vanadium oxides, highlighting the importance of the additional interlayer coupling between the layers.

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