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Ising-type Magnetic Ordering in few-layer $FePS_3$ JAE-UNG LEE, Sogang University, SUNGMIN LEE, Institute for Basic Science (IBS), Seoul National University, JI HOON RYOO, Seoul National University, SOONMIN KANG, Institute for Basic Science (IBS), Seoul National University, TAE YUN KIM, PILKWANG KIM, CHEOL-HWAN PARK, Seoul National University, JE-GEUN PARK, Institute for Basic Science (IBS), Seoul National University, HYEONSIK CHEONG, Sogang University — Magnetic ordering in two-dimensional materials is important both in fundamental science and application. However, two-dimensional material with intrinsic magnetism has not been investigated much. We present the observation of intrinsic antiferromagnetic ordering in the two-dimensional limit. Transition metal phosphorus trisulfides (MPS3) are a new class of layered materials. Some of the bulk MPS_3 materials ($FePS_3$, $MnPS_3$ and $NiPS_3$) exhibit antiferromagnetic phase transitions at low temperature. By using mechanical exfoliation, we prepared mono- and few-layer $FePS_3$ samples. We monitored the Raman peaks that arise from zone folding due to antiferromagnetic ordering below the transition temperature. We observed an Ising-type antiferromagnetic ordering in $FePS_3$ down to the mono-layer. The transition temperature is almost independent of the thickness from bulk to the monolayer with ˜118 K. This implies that the interlayer interaction has little effect on the antiferromagnetic ordering in few-layer $FePS_3$.

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