

Abstract Submitted  
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**Anomalous Hall effect and magnetic orderings in nano-thick  $V_5S_8$**   
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Univ — The rise of graphene marks the advent of two-dimensional atomic crystals,  
which have exhibited a cornucopia of intriguing properties, such as the integer and  
fractional quantum Hall effects, valley Hall effect, charge density waves and super-  
conductivity, to name a few. Yet, magnetism, a property of extreme importance in  
both science and technology, remains elusive. There is a paramount need for mag-  
netic two-dimensional crystals. Here we show that nano-thick  $V_5S_8$  is ferromagnetic  
at low temperatures. In particular, we employ the anomalous Hall effect, combined  
with magnetoresistance, to probe the magnetic ordering in  $V_5S_8$  down to 3.2 nm.  
With decreasing thickness, a transition from antiferromagnetism to ferromagnetism  
is evident. The results represents a significant step toward magnetic two-dimensional  
crystals.

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