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【163】 Magnetism in semiconducting molybdenum dichalcogenides

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We report the discovery of magnetic order in bulk semiconducting transition metal dichalcogenides (TMDs) 2H-MoTe₂ and 2H-MoSe₂ [1]. The muon spin rotation (μSR) measurements show the presence of long-range magnetic order in both compounds. DFT calculations show that this magnetism is promoted by the presence of defects in the crystal. The STM measurements show that the vast majority of defects in these materials are metal vacancies and chalcogen-metal antisites. DFT indicates that the antisite defects are magnetic with a magnetic moment in the range of 0.9 to 2.8 μ_B. These observations establish 2H-MoTe₂ and 2H-MoSe₂ as a new class of magnetic semiconductors.

[1] Z. Guguchia et. al., Science Advances 4, eaat3672 (2018).

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