

Abstract Submitted
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d⁰ ferromagnetism in PbS¹ GAURAB RIMAL, University of Wyoming, ZACHARY ARTHUR, University of Guelph, Canadian Light source, DETONG JIANG, University of Guelph, TAO LIU, PENG LI, Colorado State University, JINKE TANG, University of Wyoming — The search for magnetic semiconductors for use in spintronic technologies has led to many interesting discoveries. One profound discovery is of d⁰ ferromagnetism in wide bandgap semiconductors such as ZnO and GaN, in which intrinsic defects such as vacancies lead to ferromagnetism in a normally nonmagnetic semiconductor. The interesting aspect is that these materials are ferromagnetic at room temperature, which would be an advantage in practical spintronic applications. We have identified d⁰ ferromagnetism in lead sulfide (PbS), a narrow bandgap semiconductor. The x-ray absorption (XAS) and magnetometry results on ferromagnetic Mn doped PbS (MnPbS) show that the magnetism is not related to the Mn dopant but are associated with the concentration of sulfur vacancies. Magnetometry on PbS films also confirms this observation.

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