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Optical Characterization of Few-Layer Ferromagnetic Insulator Chromium(III) Iodide Crystals[1] DAHLIA KLEIN, EFRN NAVARRO-MORATALLA, Massachusetts Institute of Technology, KYLE SEYLER, University of Washington, DANIEL LARSON, EFTHIMIOS KAXIRAS, Harvard University, XIAODONG XU, University of Washington, PABLO JARILLO-HERRERO, Massachusetts Institute of Technology — Van der Waals heterostructures of layered 2D materials have been widely explored for the combination of conductors, semiconductors, and insulators. However, there has been little development of magnetic 2D crystalline layers, which could lead to interesting new physical states when coupled with other atomically thin materials. Thus, we have expanded this field through the study of an insulating ferromagnetic layered material: chromium(III) iodide. We have optimized the growth and characterized the crystal structure of the bulk crystals. Moreover, we have successfully exfoliated few-layer flakes down to the monolayer. In light of their sensitivity to ambient moisture, we have also developed the necessary techniques to assure the integrity of the flakes during their manipulation. The characterization via optical contrast data and Raman spectroscopy as a function of flake thickness allows for the reliable identification of few-layer samples. In particular, we have constructed models based on Fresnel's laws to quantify the number of layers of exfoliated flakes from their optical contrast values.

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