Abstract Submitted
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Raman spectroscopy of $CrSiTe_3$ multilayers[1] DENNIS WANG, Department of Applied Physics and Applied Mathematics, Columbia University, New York, New York 10027, USA, DAVID MANDRUS, Department of Materials Science and Engineering, University of Tennessee, Knoxville, Knoxville, Tennessee 37996, USA, ABHAY N. PASUPATHY, Department of Physics, Columbia University, New York, New York 10027, USA, IRVING P. HERMAN, Department of Applied Physics and Applied Mathematics, Columbia University, New York, New York 10027, USA — Ferromagnetism in two-dimensional (2-D) single crystals is a hypothesis under intense scrutiny by theorists and experimentalists alike seeking to model and realize it, respectively. Derived from an intrinsically ferromagnetic bulk compound composed of weakly coupled layers, 2-D $CrSiTe_3$ is an ideal candidate for such a study. Here we correlate the thicknesses of various $CrSiTe_3$ multilayers to their Raman spectra, accounting for the degradative effects of oxidation by fabricating devices and performing measurements in a chemically inert atmosphere. We then passivate the surfaces via encapsulation with hexagonal boron nitride (hBN) before repeating the experiments in air. Our results explain the absence of predicted phonon modes in the few-layer limit of $CrSiTe_3$ as previously observed in the literature and, more importantly, offer a reliable method of identifying the $CrSiTe_3$ monolayers that may potentially settle the debate over ferromagnetic order in reduced dimensionalities.

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