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Probing Anisotropy in Transition-Metal Dichalcogenides using Polarized Raman Spectroscopy[1] J. HARDING, J. R. SIMPSON, J.-A. YAN, Towson University, A. MCCREARY, M. TERRONES, Pennsylvania State University, D. RHODES, L. BALICAS, Florida State University, R. GHOSH, S. BANERJEE, University of Texas, Austin, A. R. HIGHT WALKER, National Institute of Standards & Technology — Highly-anisotropic, 2D, transition metal-dichalcogenides (TMD) have generated interest as a result of their polarization-dependent, Raman-active vibrational modes. Such polarization dependence offers a possible approach to practically characterize crystallographic axes, which are crucial for orientation-dependent, device applications. We systematically measure the polarized Raman spectra for the first-order Raman active modes in ReS_2, an anisotropic TMD. Mechanical exfoliation prepares few- and single-layer ReS_2 flakes on SiO_2/Si substrates. Control of sample orientation and incident/scattered polarization directions affords acquisition of Raman spectra as a function of the polarization angle. Additionally, we induce anisotropy in MoS_2, a normally isotropic TMD, through the application of strain. Monolayer MoS_2 is synthesized using CVD and transferred onto flexible PET substrates, to which mechanical strain is applied and polarized Raman spectra acquired.[2] We will discuss polarized Raman measurements with predictions from density function theory.[1]

[1]D. Doratotaj, J. R. Simpson and J.-A. Yan, PRB **93**, 075401 (2016).
[2]A. McCreary *et al.*, ACS Nano **10**, 3186 (2016).

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