

Abstract Submitted  
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**Optical observation of intercalation-induced symmetry breaking in  $\text{Fe}_x\text{-TaS}_2$**  SHIYU FAN, Univ of Tennessee, Knoxville, AMAL WAHISH, Univ of Tennessee, Knoxville, and MURR, KEVIN SMITH, KENNETH O'NEAL, Univ of Tennessee, Knoxville, IAN MANUEL, JASON HARALDSEN, University of North Florida, YOICHI HORIBE, Rutgers University, SANG CHEONG, Rutgers University, and Pohang University of Science and Technology, JANICE MUSFELDT, Univ of Tennessee, Knoxville — Fe intercalated  $\text{TaS}_2$  single crystals exhibit interesting domain patterns at room temperature with the concentration of 1/4 and 1/3. In this work, we measured the optical spectrum and Raman response of  $\text{Fe}_{1/4}\text{TaS}_2$  and  $\text{Fe}_{1/3}\text{TaS}_2$ , and compared this data with the parent compound 2H- $\text{TaS}_2$ . The optical conductivity data indicates a strong free carrier response, and Fe intercalation induced both  $d-d$  excitations and new phonon modes compared to the parent compound that are strongly related to the symmetry breaking of the parent compound. Our findings were in good agreement with first principle calculations.

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