

Abstract Submitted
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Photoluminescence and reflectivity measurements of single-layer transition-metal dichalcogenides A.T. HANBICKI, M. CURRIE, D. GUNLYCKE, A.L. FRIEDMAN, Naval Research Lab, G. KIOSEOGLU, University of Crete, B.T. JONKER, Naval Research Lab — Single layers of transition metal dichalcogenides, MX_2 ($\text{M} = \text{Mo}, \text{W}$ and $\text{X} = \text{S}, \text{Se}$) have been the focus of intense research recently because they are direct gap semiconductors with inequivalent K-points making them prime candidates for valleytronics. We have performed various optical measurements including photoluminescence (PL) and differential reflectivity in an attempt to elucidate such issues as intervalley scattering, peak assignment and spin-orbit splitting. For all of the MX_2 materials, excitonic emission is observed with wavelengths in the visible regime with the main emission occurring at the A-exciton. Additionally, identification of the B-exciton yields spin-orbit energies ranging from 170 meV to 390 meV. We will also discuss intervalley scattering based on measurements of the change in optical polarization as a function of excitation energy. This work was supported by ONR directly, and by NRL and the NRL Nanoscience Institute.

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