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Photocurrent studies on continuous large area monolayers of WS_2 and MoS_2 NESTOR PEREA-LOPEZ, ANA LAURA ELIAS-ARRIAGA, Pennsylvania State University, HUMBERTO RODRIGUEZ-GUTIERREZ, University of Lousiville, RUITAO LU, ANDRES CASTRO, Pennsylvania State University, SAIKAT TALAPATRA, SUJOY GHOSH, University of Southern Illinois, AYSE BERKDEMIR, FLORENTINO LOPEZ-URIAS, HUMBERTO TERRONES, MAURICIO TERRONES, Pennsylvania State University, MURI 24 TEAM — Continuous large area monolayers of WS_2 and MoS_2 synthesized by chemical vapor deposition were used as light sensing devices. I-V measurements and photo response measurements were performed on both materials. The photocurrent measurements were carried out from 300 °K down to 10 °K using various visible laser wavelengths (405 nm, 488 nm, 514 nm and 667 nm). A resistance decrease was registered on both materials when illuminated with the laser beam, such change was proportional to the laser photon energy and when the laser energy was lower than the band gap of each material, no photo response was observed. The layered materials were structurally characterized by Raman spectroscopy, atomic force microscopy, scanning electron microscopy and high-resolution transmission electron microscopy. Raman spectra confirms the presence of monolayers and UV-visible spectra revealed the resonance peaks at the energies close to the direct band gap predicted for single layers of WS_2 and MoS_2 (2.05 eV and 1.85 eV). Further experiments on time response and continuous spectral response are now underway and will be presented.

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