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Synthesis and Characterization of 2-D Materials[1] S PAZOS, Louisiana Tech Univ, P SAHOO, T AFANEH, H RODRIGUEZ GUTIERREZ, Univ. of South Florida — Atomically thin transition-metal dichacogenides (TMD), graphene, and boron nitride (BN) are two-dimensional materials where the charge carriers (electrons and holes) are confined to move in a plane. They exhibit distinctive optoelectronic properties compared to their bulk layered counterparts. When combined into heterostructures, these materials open more possibilities in terms of new properties and device functionality. In this work, WSe_2 and graphene were grown using Chemical Vapor Deposition (CVD) and Physical Vapor Deposition (PVD) techniques. The quality and morphology of each material was checked using Raman, Photoluminescence Spectroscopy, and Scanning Electron Microscopy. Graphene had been successfully grown homogenously, characterized, and transferred from copper to silicon dioxide substrates; these films will be used in future studies to build 2-D devices. Different morphologies of WSe_2 2-D islands were successfully grown on SiO_2 substrates. Depending on the synthesis conditions, the material on each sample had single layer, double layer, and multi-layer areas. A variety of 2-D morphologies were also observed in the 2-D islands.

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