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Electrophoretic Deposition of MoS2 Thin Films as a Bandgap Engineered Material¹ ALEX YOUNG, THEDA DANIELS-RACE, Louisiana State University — Molybdenum Disulfide (MoS_2) and other transition metal dichalcogenides (TMDCs) have recently been of great interest to researchers because of their electrical, optical, and catalytic properties. Monolayer TMDCs are especially sought after for their excellent optoelectronic properties due to a direct bandgap as opposed to their bulk counterparts. However, the various methods used to fabricate the monolayered structures, such as chemical vapor deposition (CVD) and lithium intercalation, are expensive, labor intensive, and hazardous. We present current research into TMDC deposition using electrophoretic deposition (EPD) with the goal of fabricating a uniform monolayer of MoS_2 on a silicon wafer. The EPD parameters of applied voltage, inter-electrode distance, and deposition time will be controlled and calibrated with respect to predicted and measured MoS_2 layer thicknesses. Characterization methods will be geared toward confirming coverage, uniformity, sample thickness, and material quality. Our investigation of this technique is within the context of extrapolation to different TMDCs, such as $MoSe_2$ or WS_2 , for deposition upon conductive and surface treated insulating substrates.

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