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Intercalant Based E-Beam Lithography on a Layered Dichalcogenide Surface TIMOTHY KIDD, TYLER RASH, LAURA STRAUSS, University of Northern Iowa — We have developed a novel method for creating surface structures on the surface of dichalchogenides using a scanning electron microscope. Using a single shot chemical vapor transport method, large (several mm diameter) single crystals of TiSe2 were synthesized with thin films of CuI upon their surfaces. The films were locally ordered, with distinct pyramidal nanostructures detected using atomic force microscopy (AFM) and scanning electron microscopy (SEM). After removing the surface layers via cleaving, the CuI films at the surface could be renewed by heating the sample. However, it was also found that the formation of these secondary CuI films could be impeded locally by controlled scanning of the SEM. In this way, one could create artificial micro- or nano- structured films upon the dichalcogenide surface in a manner similar to that of standard E-beam lithography. This technique could be used in the development of unique electro-optical devices on dichalchogenide crystal or thin film substrates.

Timothy Kidd
University of Northern Iowa

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