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Growth of TiSe2 Thin Films Using Chemical Vapor Transport¹ T. POLAKOVIC, M. BOWEN, M. PRECNER, J. CURTIS, J. RAYER, S. CIO-CYS, E. DAS GUPTA, G. KARAPETROV, Dept. of Physics, Drexel University, Philadelphia, PA 19014, Q. QIAO, Brookhaven National Laboratory and Dept. of Physics, Temple University, Philadelphia, PA 19122, Y.M. ZHU, Brookhaven National Laboratory, Upton, NY 11973 — TiSe₂ is a member of transition metal dichalcogenide family of layered van-der-Waals materials that exhibits some distinctive electronic and optical properties due to the presence of excitonic condensate and strong electron-phonon coupling. This makes $TiSe_2$ a candidate for electronic, thermoelectric, and energy applications. We report on the growth of $TiSe_2$ thin films using chemical vapor transport with I_2 as a transport agent. Atomic force microscopy and transmission electron microscopy are used to determine the structure of grown films confirming single-crystalline layered structure of the films. Kelvin probe microscopy and resistivity measurement show transition into charge density wave state at temperatures below 180 K. Somewhat lower CDW transition temperature than in single crystals suggests carrier doping due to presence of intrinsic defects.

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