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Scalable growth and characterization of monolayer WSe_2 FRANK MCKAY, MATT SEITZ, MATTHEW ADAMS, PAUL NGUYEN, JENNIFER HEATH, DAVID COBDEN, University of Washington — 2D materials such as monolayer WSe_2 have unique optoelectronic properties which enable the manufacture of new types of devices. To create monolayer films, typically, WSe_2 is mechanically exfoliated using adhesive tape, which is not a scalable approach. To address this problem we use physical vapor deposition to deposit films. We insert a secondary heating coil into our furnace that allows us to create two temperature zones that are both separately tunable and locally uniform. By separately controlling the source and substrate temperatures we produce single, more uniform, larger 2D crystals of up to 15 microns. We have prepared field-effect transistors using both grown and exfoliated WSe_2 crystals, allowing the electronic quality to be compared.

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