Abstract Submitted
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Physical Vapor Deposition Growth of Topological Insulator Nanostructures[1] LOREN ALEGRIA, ANASUA CHATTERJEE, ZHONG ZHANG, MICHAEL PRETKO, JAMES TING, SHIVANG PATEL, JASON PETTA, Princeton University — Nanostructures consisting of strong topological insulators are of interest for the fabrication of devices in which surface state transport is dominant. We report Bi_2Se_3 nanoribbon and nanoplatelet growth using a multi-zone furnace.[2] Nanoribbons are grown by the vapor-liquid-solid method, using Au nanoparticles or Au thin films ($\sim$5 nm) as catalysts, while nanoplatelets are grown on bare silicon. We systematically vary the growth parameters, including the temperatures of the powdered Bi_2Se_3 precursor and growth substrate, the growth pressure and duration, the rate of the Argon carrier gas flow, size of the gold catalyst, and the quantity of Bi_2Se_3 source material. Typical nanoribbon growth occurs at 450°C and 350 Torr, with the precursor held at 530°C in an Argon carrier gas flow rate rate of 140 sccm. Typical platelet growth occurs at lower pressures and temperatures. High resolution transmission electron microscopy, diffraction, and energy dispersive x-ray analysis are used to characterize the synthesized structures.

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[2]D. Kong *et al.*, Nano Lett. **10**, 329 (2010).

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