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Topological insulator Bi₂Se₃ thin film growth by MBE SHUANG LI, YIJIE HUO, DONG LIANG, Stanford University, THORSTEN HESJEDAL, University of Waterloo, JAMES HARRIS, Stanford University — Single crystalline high quality Bi₂Se₃ thin films were growth by molecular beam epitaxy (MBE) on sapphire c-plane substrate in UHV environment. X-ray diffraction (XRD) proved single crystal growth is achieved. Atomic ratio was measured by x-ray photoelectron spectroscopy (XPS) and Auger electron spectroscopy. The growth parameters, including substrate temperatures ranging from room temperature to 400°C, growth rate ranging from 0.5 nm/minute to 10 nm/minute and bismuth and selenium flux ratio, were optimized based on the results from scanning electron microscope (SEM), atomic force microscopy (AFM), XRD, and Raman spectroscopy. Triangle and hexagonal single crystals were preferred in the beginning of the growth at high temperature. More Bi₂Se₃ growth mechanisms will be discussed in the conference.

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