Abstract Submitted
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Growth of topological insulators on Si(111)-(7×7) surfaces by molecular beam epitaxy[1] ANUPAM ROY, SUSHANT SONDE, SAMARESH GUCHHAIT, SANJAY BANERJEE, Microelectronics Research Center, The University of Texas at Austin — Following the theoretical prediction about Bi_2X_3 (X=Se, Te) being a topological insulator (TI) because of strong spin-orbit interactions, interest has grown in integrating these materials with Si technology for potential future devices. In this work, we will be presenting the epitaxial TI structures grown by molecular beam epitaxy (MBE) by codepositing high purity Bi and Se or Te onto the clean Si(111)-(7×7) substrates under ultra-high vacuum (base pressure better than 1×10^{-10} mbar). In-situ studies show sharp streaky reflection high-energy electron diffraction (RHEED) patterns. Scanning tunneling microscopy (STM) studies show the growth of Bi_2Se_3 islands along the terraces. High resolution STM studies show hexagonal atomic structure of Bi_2Se_3. For Bi_2Te_3, STM shows that the growth follows a layer-by-layer mode with the height difference being same as the quintuple layer height of Bi2Te3. Spectroscopy studies of the grown film to confirm the chemical stoichiometry will also be presented.

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