Abstract Submitted
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Visualizing the native atomic defects in Bi_2Se_3 with scanning tunneling microscopy[1] JIXIA DAI, Department of physics and astronomy, Rutgers University, DAMIEN WEST, Department of Physics, Applied Physics, and Astronomy, Rensselaer Polytechnic Institute, XUEYUN WANG, YAZHONG WANG, DANIEL KWOK, SANG WOOK CHEONG, Department of physics and astronomy, Rutgers University, SHENGBAI ZHANG, Department of Physics, Applied Physics, and Astronomy, Rensselaer Polytechnic Institute, WEIDA WU, Department of physics and astronomy, Rutgers University — In topological insulators such as Bi_2Se_3 the existence of native atomic defects is one of the major bottlenecks for potential applications utilizing the topologically protected surface states. Native defects such as vacancies or antisites are believed to be responsible for the metallic transport observed in Bi_2Se_3. In this study, we examined a series of Bi_2Se_3 samples that were grown with different conditions using atomically resolving scanning tunneling microscopy. We have successfully identified several types of intrinsic defects, including Se vacancies and Bi-Se antisites. The individual defect images are corroborated by first principle calculations. The densities of these defects across different samples are correlated with their growth conditions. Preliminary results suggest the defect densities can account for the charge carrier density estimated from tunneling spectroscopy.

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