

Probing the electronic structure of magnetic topological insulator (BiSbV)₂Te₃ thin films with soft X-ray photoelectron spectroscopy

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We investigated the electronic structure of (BiSbV)₂Te₃ thin films by means of X-ray photoemission (XPS) and absorption (XAS) spectroscopy. This system is a three-dimensional magnetic topological insulator, recently reported

as an anomalous quantum Hall system. The films were epitaxially grown on a Si(111) crystal and covered by a Se cap to avoid contamination during exposition to air. After thermally desorbing the Se cap, the core-level lines of the constituent elements and the V L_{2,3} absorption edges were measured for different V concentrations (0, 2 and 4 at.%). Our data evidence the incorporation of Se atoms in the film. By means of resonant photoemission we identify the signature of the V 3d states at the Fermi level, which may contribute to the exotic transport properties of the system. We show that our techniques are well suited for the study of the electronic properties of this novel class of materials.

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