Abstract Submitted
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Nanoscale Conducting and Insulating Domains on YbB_6[1] JENNIFER HOFFMAN, University of British Columbia, ZHIHUAI ZHU, YANG HE, Harvard University, DAE-JEONG KIM, ZACHARY FISK, University of California, Irvine — Recent photoemission studies on YbB_6 reported a metallic surface but without f-states pinned at the Fermi level, in contradiction to the theoretical prediction of YbB_6 as a topological Kondo insulator. Thus the topological nature of YbB_6 remains unclear and requires a study that can distinguish trivial surface structure and non-trivial topological effects derived from the bulk. We use scanning tunneling microscopy and spectroscopy (STM/STS) to provide a real-space microscopic picture of the surface electronic structure in YbB_6. We observe coexisting nanoscale metallic and insulating surface terminations. The surface conductivity of each termination reflects the degree of downward or upward band bending that is determined by the surface polarity. In addition to demonstrating that surface metallically in YbB_6 stems from band bending at the polar surface, our study suggests the utility of YbB_6 for creating spin-polarized p-n junctions at the atomic scale.

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