

Abstract Submitted
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Electronic gap in SmB_6 studied by Raman spectroscopy¹

MICHAEL VALENTINE, SEYED KOOHPAYEH, Johns Hopkins University, XI-ANGFENG WANG, YASUYUKI NAKAJIMA, JOHNPIERRE PAGLIONE, University of Maryland, COLLIN BROHOLM, WILLIAM PHELAN, TYREL MC-QUEEN, NATALIA DRICHKO, Johns Hopkins University — SmB_6 is a mixed valence compound which is suggested to be a topological Kondo insulator. Studies of insulating vs metallic properties of the bulk and the nature of the surface conduction are still ongoing. Using Raman scattering, we follow the opening of an electronic gap in samples of pure SmB_6 and SmB_6 with Al and C impurities. In all of the samples we observe an electronic gap in the range of 50-65 meV, confirming insulating state in the bulk. The gap appears in the $A_{1g}+E_g$ spectra as a suppression of low-frequency electronic scattering and a shift of the spectral weight to frequencies above the gap below approximately 100 K. The size of the gap and presence of electronic states in the gap depend on the method of growth (floating zone vs Al flux), and the chemical composition of the sample. We discuss a dependence of these parameters on the impurities and Sm valence.

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