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Electronic Excited States at the NaCl/Ag(100) Interface[1] DAVID SUICH, BENJAMIN CAPLINS, ALEX SHEARER, CHARLES HARRIS, University of California - Berkeley — The alkali halide/metal interface represents a model insulator/metal system and has attracted much attention recently for their ability to decouple molecular properties from bulk metal. There are, however, few time resolved studies of these systems. We used two photon photoemission to study the dynamics of the electronic states at the NaCl/Ag(100) interface. We find a series of image potential states, where the lowest lying (n=1) member of the series is hybridized with the conduction band of NaCl. Electrons in this hybrid state undergo significant trapping, as shown by a change in their energy and spatial extent on the ultrafast time scale. Our studies correlate coverage and temperature with the dynamics and energetic trapping of electrons in this state. Momentum resolved measurements reveal that electrons in this state are initially delocalized, but become localized within a few hundred femtoseconds either due to small polaron formation or trapping at a defect. Qualitatively similar behavior has been observed for several other alkali halides on both the Ag(100) and Ag(111) surfaces, proving the generality of the phenomenon.

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