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Trapping of Excited Electrons at the NaCl/Ag(100) Interface[1]
DAVID SUICH, BENJAMIN CAPLINS, ALEX SHEARER, CHARLES HARRIS, Univ of California - Berkeley — Understanding metal/insulator systems, such as alkali halides on noble metals, and their properties are important for the fields of catalysis, devices, and the emerging field of nanoelectronics. To date, however, there remain few time-resolved studies of these systems. Time- and angle- resolved two-photon photoemission is used to study the dynamics of the electronic states at the NaCl/Ag(100) interface. We observe the n=1, 2, and 3 image potential states. Electrons in the n=1 state undergo a trapping with a high probability, as shown by a dynamic change in their energy. Momentum resolved measurements show this state is initially delocalized, but becomes localized within a few hundred femtoseconds. The source of trapping is believed to occur at step edges of the NaCl islands. Our studies correlate the coverage and temperature dependence with the dynamics and magnitude of electron trapping in this state. 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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