

Abstract Submitted
for the SES08 Meeting of
The American Physical Society

Shockley-type Surface State Modification for Enantiopure vs. Racemic Tartaric Acid on Ag(111) NANCY SANTAGATA, PENGSHUN LUO, BRYCE DAVIS, THOMAS PEARL, North Carolina State University — Shockley-type surface states exist on several metal surfaces and are characterized by electron confinement by the vacuum barrier on one side and a band gap in the bulk on the other. We will report the observation of Shockley-type surface state energy shifts as a signature of adsorbate structure for tartaric acid ($C_4H_6O_6$) on Ag(111). The adsorption of both enantiopure and racemic tartaric acid in the submonolayer regime was studied with low temperature scanning tunneling microscopy (STM) and spectroscopy (STS) and modeled with density functional theory (DFT). We find that the surface state, which is occupied on the clean Ag(111) surface (67 meV below the Fermi level), experiences a positive energy shift and becomes unoccupied after the adsorption of both forms of tartaric acid. The magnitude of the shift differs, however, for films composed of either enantiopure or racemic domains, and we attribute these relative shifts to unique adsorbate units. DFT is used to confirm the molecular-level adsorbate arrangements that lead to the experimentally observed behavior.

Nancy Santagata
North Carolina State University

Date submitted: 31 Jul 2008

Electronic form version 1.4