

Abstract for an Invited Paper
for the NWS05 Meeting of
The American Physical Society

Orbital Mediated Tunneling Spectroscopy and Imaging Electron Transport Pathways¹

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Chemical specificity within the scanning tunneling microscope (STM) is significantly enhanced by performing STM based orbital mediated tunneling spectroscopy (OMTS). Structurally similar compounds having similar STM images are easily differentiated by their OMTS. The principal mechanisms for OMTS will be discussed and experimental OMT bands will be compared to ultraviolet photoelectron spectra and to first electron affinity and ionization levels estimated from electrochemical data. Evidence will be presented that the molecular potential is sometimes fixed at the substrate potential and the consequences of failure of this condition will be considered. Constant current images acquired at voltages near resonance values reflect the spatial distribution of the orbitals involved in the transport process. Maps of local electron transport on a sub-molecular scale will be presented.

¹Work supported by the NSF