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Induced Nanoscale Surface Vacancies and their Local Electronic Characteristics ANDREW DILULLO, Argonne National Laboratory and Ohio University, YANG LI, Argonne National Laboratory and Ohio Univeristy, DANDA PANI ACHARYA, Ohio University, NOBORU TAKEUCHI, Ohio University and Universidad Nacional Autonoma de Mexico, SAW-WAI HLA, Argonne National Laboratory and Ohio University — Nanoscale surface topological variations effect local electrochemical properties. We directly alter nanoscale surface corrugation by local probe manipulations using a scanning tunneling microscope and report here the procedure and resulting changes in surface electrochemistry. Tunneling resonances, found at certain probe-sample biases, are found by analysis of spatial height-differential mapping (dz/dV). These resonances result from field emission where the emitted electron has greater energy than the local surface potential at the probe lateral position. We extract, by fitting to Gundlach's equation, the tip work function, sample work function at probe position, and absolute tip height from the sample. The difference in the extracted work function at the surface vacancies and the surface terraces demonstrates a significantly altered electronic character. It is important to be able to understand nanoscale variations in the local work function, as this surface potential can play a large role in determining the outcome of attempted surface electrochemistry.

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