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Operando Positron Annihilation Gamma Spectrometer (OPAGS)

S. SATYAL, K. SHASTRY, University of Texas at Arlington, S. MUKHERJEE, University of Texas at Arlington, A.H. WEISS, University of Texas at Arlington — Surface properties measured under UHV conditions cannot be extended to surfaces interacting with gases under realistic pressures due to surface reconstruction and other strong perturbations of the surface. Surface probing techniques require UHV conditions to perform efficiently and avoid data loss due to scattering of outgoing particles. This poster describes the design of an Operando Positron Annihilation Gamma Spectrometer (OPAGS) currently under construction at the University of Texas at Arlington. The new system will be capable of obtaining surface and defect specific chemical and charge state information from surfaces under realistic pressures. Differential pumping will be used to maintain the sample in a gas environment while the rest of the beam is under UHV. Elemental content of the surface interacting with the gas environment will be determined from the Doppler broadened gamma spectra. This system will also include a time of flight (TOF) Auger spectrometer which correlates with the results of the Doppler measurements at lower pressures. By employing the unique capabilities of OPAGS together with those of the TOF PAES spectroscopy the charge transfer mechanisms at the surface in catalytic systems can be understood.

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