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Positron Annihilation Induced Auger and Gamma Spectroscopy of Catalytically Important Surfaces A.H. WEISS, M.P. NADESALINGAM, R. SUNDARAMOORTHY, S. MUKHERJEE, N.G. FAZLEEV, Physics Department, The University of Texas at Arlington — The annihilation of positrons with core electrons results in unique signatures in the spectra of Auger-electron and annihilation-gamma rays that can be used to make clear chemical identification of atoms at the surface. Because positrons implanted at low energies are trapped with high efficiency in the image-correlation well where they are localized just outside the surface it is possible to use annihilation induced Auger and Gamma signals to probe the surfaces of solids with single atomic layer depth resolution. In this talk we will report recent applications of Positron Annihilation Induced Auger Electron Spectroscopy (PAES) and Auger-Gamma Coincidence Spectroscopy (AGCS) to the study of surface structure and surface chemistry. Our research has demonstrated that PAES spectra can provide new information regarding the composition of the top-most atomic layer. Applications of PAES to the study of catalytically important surfaces of oxides and wide band-gap semiconductors including TiO_2 , SiO_2 , Cu_2O , and SiC will be presented. We conclude with a discussion of the use of Auger-Gamma and Gamma-Gamma coincidence spectroscopy for the study of surfaces at pressures closer to those found in practical chemical reactors. Research supported by the Welch Foundation Grant Number Y-1100.

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