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Experimental determination of the relationship between electron time of flight and energy for the UTA Time of Flight Positron Annihilation Induced Auger Electron Spectrometer K. IMAM, V. CHIRAYATH, R. GLADEN, A. MCDONALD, M. CHRYSLER, A. KOYMEN, A. WEISS, The University of Texas at Arlington, UTA POSITRON SURFACE LABORATORY TEAM — In Positron Annihilation induced Auger Electron Spectroscopy (PAES), a sample is irradiated using low energy positrons. Chemical information about the surface is obtained through the analysis of the energy of electrons emitted from the surface as a result of the annihilation of positrons bound in a surface state. In the UTA Time of Flight (TOF) PAES system, the energy of the electrons is determined from the TOF obtained by measuring the time between pulses generated by the detection of the 511 keV annihilation gamma and the detection of the positron induced electron after traversing a ˜1 m flight path. In this study, histograms of the TOF distributions of positron-impact-induced secondary electrons leaving the sample for a series of sample biases, V_s, (- 0.5V to -900V), were obtained using a time-to-amplitude converter and a multichannel analyzer. The distributions were analyzed to determine the (cutoff) channel corresponding to the TOF of the lowest energy electrons leaving the sample which were assumed to enter the TOF spectrometer with an energy (eV) given by (-e)V_s. An analytic functional form was obtained from a fit of Cutoff-channel vs. sample bias data which was used to convert the TOF data into energy spectra for identifying the energy of electrons in PAES spectra.

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