

Abstract Submitted
for the TSF06 Meeting of
The American Physical Society

Observation of the high sensitivity of Positron Annihilation induced Auger electron spectroscopy to thermally induced changes in the oxidation state of Cu atoms at the surface of previously oxidized Cu(100)¹

M.P. NADESALINGAM, S. MUKHERJEE, N. FAZLEEV, B.R. DAVIS, J. ZHU, A.H. WEISS, Department of Physics, The University of Texas at Arlington — Changes in the surface of an oxidized Cu(100) single crystal resulting from vacuum annealing over a temperature range from 20 °C to 800 °C has been investigated using Positron annihilation induced Auger electron spectroscopy (PAES). The PAES measurements show a large monotonic increase in the intensity of the annihilation induced Cu ($M_{2,3}VV$) Auger peak as the sample is subjected to a series of isochronal anneals in vacuum up to annealing temperature 300 °C. The intensity then decreases monotonically as the annealing temperature is increase to ~ 600 °C. The Ps fraction, f_{PS} of these surfaces was found to have the opposite trend going from $f_{PS} = 0.79$ for the surface before any annealing to $f_{PS} = 0.51$ after annealing at 300 °C. These results provide a clear demonstration of the thermal reduction of the copper oxide surface after annealing at 300 °C followed by re-oxidation of the copper surface at the higher annealing temperatures presumably due to the diffusion of subsurface oxygen to the surface.

¹Research is funded by Welch Foundation (grant Y-1100)

Manori Nadesalingam
Department of Physics, The University of Texas at Arlington

Date submitted: 12 Sep 2006

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