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Studies of oxidation of the Cu(100) surface using low energy positrons

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Abstract

Changes in the surface of an oxidized Cu(100) single crystal resulting from vacuum annealing have been investigated using positron annihilation induced Auger electron spectroscopy (PAES). PAES measurements show a large increase in the intensity of the positron 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 increased to ~600° C. Experimental PAES results are analyzed by performing calculations of positron surface states and annihilation probabilities of surface-trapped positrons with relevant core electrons taking into account the charge redistribution at the surface, surface reconstructions, and electron-positron correlations effects. Possible explanation for the observed behavior of the intensity of positron annihilation induced Cu M_{2,3}VV Auger peak with changes of the annealing temperature is proposed. © 2009 American Institute of Physics.

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Keywords

Annihilation, Auger, Beam, Cu, Oxides, Positron, Spectroscopy, Surface