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Studies of the Ge(100) Surface Using a Low Energy Positron Beam: The Effects of Surface Reconstructions on Positron Trapping and Annihilation Characteristics N. G. FAZLEEV, A. H. WEISS, Department of Physics, University of Texas at Arlington — Positron annihilation induced Auger electron spectroscopy (PAES) has been applied to study the Ge(100) surface. The PAES spectrum from the Ge(100) surface displays several strong Auger peaks corresponding to M4,5N1N2,3 , M2,3M4,5M4,5 , M2,3M4,5V, and M1M4,5M4,5 Auger transitions. The integrated peak intensities of Auger transitions are used to obtain experimental annihilation probabilities for the Ge 3d and 3p core level electrons. The experimental results are analyzed by performing calculations of positron surface states and annihilation characteristics of surface trapped positrons with relevant Ge core-level electrons for the reconstructed Ge(100)-p(2x1), Ge(100)-p(2x2), and Ge(100)-c(4x2) surfaces. Estimates of positron binding energy, work function, and annihilation characteristics reveal their sensitivity to surface reconstruction of the topmost layers of clean Ge(100). These results are compared to the ones obtained for the reconstructed Si(100)-(2x1) and Si(100)-p(2x2) surfaces. A comparison with PAES data reveals an agreement with theoretical core annihilation probabilities for the Auger transitions considered.

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