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Positron Trapping and Annihilation at Reconstructed Ge(100)-(2x1) and Ge(111)-(2x8) Surfaces[1] J. L. FRY, N. G. FAZLEEV, A. H. WEISS, University of Texas at Arlington — The results of studies of Ge(100) and Ge(111) surfaces using high-resolution positron-annihilation-induced Auger electron spectroscopy are analyzed by performing quantum mechanical calculations of the image-potential surface states and annihilation characteristics for positrons trapped at the reconstructed Ge(100)-(2x1) and Ge(111)-(2x8) surfaces. Estimates of the positron binding energy, work function, and annihilation characteristics reveal their sensitivity to surface reconstruction of the topmost layers of clean Ge. Comparison of theoretical positron annihilation probabilities computed for different reconstructed surfaces with experimental ones estimated from the measured Auger peak intensities permits identification of the atomic structure of the topmost layers of the reconstructed surfaces. The effects of adsorbates on the localization of positron surface state at the semiconductor surface and positron annihilation characteristics are discussed.

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