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Positron Trapping and Annihilation at Reconstructed Ge(100)-(2x1) and Ge(111)-(2x8) Surfaces ARNAB K. PAL, NAIL G. FAZLEEV, University of Texas at Arlington — The results of experimental studies of Ge(100) and Ge(111) surfaces using high-resolution positron-annihilation-induced Auger electron spectroscopy are analyzed by performing 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 positron binding energy, work function, and annihilation characteristics reveal their sensitivity to surface reconstruction of the topmost layers of clean Ge. These results are compared to the ones obtained for the reconstructed Si(100)-(2x1), Si(100)-p(2x2), and Si(111)-(7x7) surfaces. Comparison of theoretical positron annihilation probabilities computed for different reconstructed surfaces of Ge 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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