ELECTROREFLECTION MODULATION SPECTROSCOPY STUDIES OF A NEAR-SURFACE LAYER IN SEMICONDUCTORS AND SEMICONDUCTOR-BASEDSTRUCTURES

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S u m m a r y

The possibility for the electroreflection modulation spectroscopy to be applied for studying the electronic parameters of the surfaces of semiconductors and semiconductor-based structures, as well as the electrolyte—semiconductor and metal—semiconductor interfaces, has been demonstrated. Making use of the polarization (tensor) anisotropy of the electrooptical effect, the surface and bulk contributions to the electroreflection signal have been separated. The effectiveness of the separation method has been demonstrated for the analysis of the electroreflection spectra from the (110) surface of germanium with intrinsic conductivity measured for the E_1 and $E_1 + \Delta_1$ transitions (within the spectral range 1.9—2.5 eV) provided the directions of the light polarization vector $\mathbf{e} \parallel [001]$ and $\mathbf{e} \parallel [1\bar{1}0]$ and the temperature $T = 300$ K. The energy diagram of the etched surface of i-Ge has been revealed to involve an extremum. The occurrence of such an extremum has been attributed to the vanishing of the electron work function at the surface and/or to the influence of the specular image forces.