INTERACTION OF OXYGEN AND GADOLINIUM WITH Si(100)-2 \times 1 SURFACE. FORMATION OF A SYSTEM WITH 1-eV WORK FUNCTION

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Summary

Changes in the electronic properties of the Si(100) surface, when a multilayer structure of oxidized Gd atoms is created on it, have been studied, by using the electron spectroscopy methods. It is shown that, after a number of adsorption cycles of Gd and oxygen atoms on the Si(100)- 2×1 surface at room temperature and the annealing of the obtained structure at 600 °C, the work function decreases from 4.8 to less than 1 eV. The work function reduction at larger numbers of processing cycles is shown to be accompanied by the oxidation of Gd and Si atoms and a gradual decrease of the Si concentration in the near-surface region. The obtained results are explained by the formation of an O–Gd dipole layer on the surface.