

Nanostructured surfaces

Field effect and surface potential in structures with Ge-nanoclusters.

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The structures consisting of Ge-nanoclusters grown on silicon oxide layer are promising candidates for optoelectronic devices as well as for nonvolatile memory circuits, nanotransistors and solar cells. This is due to their optical and photoconductive properties.

Crystalline germanium nanoclusters (NCs) are grown by a molecular-beam epitaxy technique on chemically oxidized Si(100) surface at 700°C.

Lateral transport and Kelvin force microscopy measurements have shown that structures with Ge-nanoclusters, grown on oxidized silicon surface characterized by fluctuations of the electrostatic potential caused by spatial distribution of holes trapped by quantum confinement states of Ge-nanoclusters or/and interface traps of Ge-nanoclusters/SiO₂ and SiO₂/Si interfaces. Field effect on lateral conductivity and surface photovoltage spectra were investigated.

1. V.S. Lysenko, Yu.V. Gomeniuk, Yu.N. Kozyrev, M.Yu. Rubezhanska, V.K. Sklyar, S.V. Kondratenko, Ye.Ye. Melnichuk, C. Teichert, Effect of Ge nanoislands on lateral photoconductivity of Ge-SiO_x-Si structures, Adv. Mat. Res. 276 (2011) 179-186.