A SIMPLE OXIDATION TECHNIQUE FOR QUANTUM DOT DIMENSION SHRINKAGE AND TUNNEL BARRIERS GENERATION

Abstract

The tunnel barriers generation and the quantum dot size shrinkage play a significant role in single-electron transistor (SET) fabrication. Because the numerically etch indicators were not found, the technical indicators, high contrast surface and high smoothness surface were used to optimize the etch process. Si nanostructures oxidation using either oxidation furnace or rapid thermal processing (RTP) equipment can result in silicon dioxide (SiO_2)-embedded-Si. In this research, we compare the furnace-oxidized-Si nanostructures with the RTP-oxidized-Si nanostructures. The oxidation rate of Si nanostructures using a furnace is 0.36 nm/s, while the oxidation rate of Si nanostructures using RTP is 2.16 nm/s.

Author Keywords

Pattern-dependent oxidation; Quantum dot; Rapid thermal processing; Reconstruction method