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Electric field induced slanting growth of silicon nanowires with enhanced hydrophobic property

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Abstract

The etching process of Si nanowires under DC electric field was studied in this work. Interestingly, the growth direction of silicon nanowires became slanting when applied with DC electric intensity of 600 V/m, which greatly influenced the surface wettability ascribed to the variation of surface morphologies. The contact angle of slant Si nanowire was enhanced compared with vertical growth Si nanowire (132.4° vs. 86.8°).

Keywords

Microstructure; Si Semiconductors; Electric field; Surfaces

1. Introduction

In natural world, numbers of fascinating materials and structured surfaces are built with excellent surface wettability [1]. Biomimetic investigations have demonstrated that some natural superhydrophobic phenomena, such as the de-wetting behavior of lotus in plantae [2] and superhydrophobicity of a water strider's leg in insect. [3] These superhydrophobic behaviors are related to their unique micro- and nanostructured surfaces, especially, the lotus leaf is one of the most well-known and

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