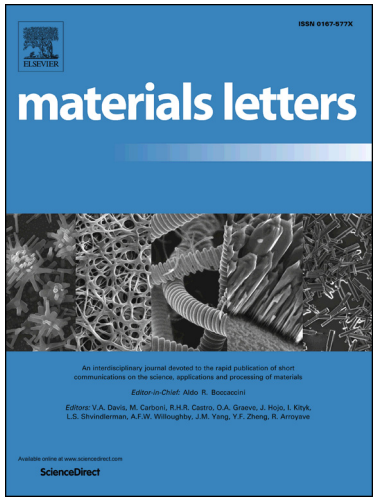

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A facile fabrication of high-quality Si/Cu_2O nanowire arrays for photoelectrochemical water splitting

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Abstract

As the potential applications of nanostructured Si/Cu_2O heterojunction in electronic and photoelectronic devices, various methods has been developed to fabricate such heterojunctions. In this study, the Si/Cu_2O heterojunction nanowire arrays were fabricated by the in-situ thermal decomposition of $Cu(NO_3)_2$ on silicon nanowires. The as-decomposed Cu_2O nanoparticles were found to be uniformly distributed on the surfaces of Si nanowires. The microstructure, chemical composition and states of the products were investigated. Utilized as photoanodes for photoelectrochemical water splitting, the Si/Cu_2O heterojunction nanowire arrays exhibited a maximum photocurrent density of 4 mA/cm^2 at 1.23 V vs. RHE and an onset potential of 0.62 V vs. RHE.

Keywords: thermal decomposition method; Si/Cu_2O heterojunction; photoelectrochemical

1. Introduction

Semiconductor heterojunctions own improved performance in photonic [1] and electronic devices