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Etching time effect on optical properties of porous silicon for solar cells fabrication

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Abstract

The dependence of porous silicon (PS) morphology on fabrication conditions using electrochemical etching (ECE) was investigated. The porosity of the material is determined by gravimetric analysis. The effect of various etching time: 30, 60, and 120 min with a constant DC current density of 5 mA/cm², on structural and optical properties of PS has been studied. The optical properties such as reflectivity, energetic transition, and refractive index were analyzed by using specific models. Photoluminescence spectroscopy (PL) was conducted to elaborate the energy gap of PS. UV-visible spectrometry was used to study the optical properties of processed samples with various percentage porosity: 9.47%, 33.39%, and 63.93%. The obtained results are in good agreement with both theoretical and experimental data.

Keywords: Porous silicon; Photoelectrochemical etching; Optical properties.

1. Introduction

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