International Journal of Applied, Physical and
Bio-Chemistry Research (IJAPBCR)
ISSN(P): 2277-4793; ISSN(E): 2319-4448
Vol. 5, Issue 3, Dec 2015, 33-48




# PREPARATION AND PHYSICAL CHARACTERIZAYION OF POROUS SILICON LAYERS FOR SENSING APPLICATIONS

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***ABSTRACT***

***Porous silicon (PSi) has emerged as a potential sensing applications because of its high surface area to volume ratio, convenient surface chemistry, and very low toxicity. Porous silicon layers have been prepared from non-polished p-type silicon wafers of (100) orientation using electrochemical etching with different electrolyte concentrations and etching times. Scanning electron microscopy (SEM), photolumincensce (PL) spectroscopy and spectrophotometer measurement have been used to characterize the morphological and optical properties of porous silicon. The influence of fabrication parameters (hydrofluoric acid (HF) solution, the anodizing current density and anodizing time) on the morphological and optical properties of porous silicon has been investigated. SEM micrographs showed that by changing HF: ethanol concentration ratios, in the electrochemical process two peculiar surface morphologies were obtained. The surface morphology in the central region of the sample consists of solid cells delimited by trenches and the trenches bottom was covered by polyhedral pores. The PL spectrum peak at the anodizing time ranged from 590 to 610nm. PSI samples showed lower reflectance measurements and the optical energy band gap increases with increasing etching time.It could be clearly seen that porosity of PSi layers increases with increasing etching time and dilution of the electrolyte concentration which reflect on both increasing of PL intensity and decreasing reflectance with increasing porosity that gives the ability for using PSi in solar cells and bio sensing applications.***

***KEYWORDS: Porous Silicon, SEM, PL***

**Received:** Oct 15, 2015; **Accepted:** Oct 28, 2015; **Published:** Nov 04, 2015; **Paper Id.:** IJAPBCRDEC20154

Original Article