

Photoluminescence of Porous Silicon

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Abstract:

Porous silicon can be considered as crystalline silicon, it has a network of voids in its bulk, soon became one of the most well researched silicon structures. It shows highly tunable structural, mechanical, optical, electrical, thermal, emissive, and physiochemical properties. Some of its properties like luminescence and medical biodegradability are direct consequences of nanoscale porosification and are not observed in bulk. Electrochemical etching in silicon with dilute hydrofluoric acid (HF) has been performed to obtain photoluminescence PL. The effects of silicon type and etching condition on porosity and photoluminescence have been reported in this work. We investigate that the porosity of the P-Si was in the range of (50-80 %) and it is dependent on etching time. The intensity of PL increase with the etching time and the band gap energy of P-Si was higher than silicon which is from 1.9 eV to 2 eV and the blue shift of the PL peak observed as the porosity increases.

Keywords: Electrochemical etching, porosity, photoluminescence PL, Band gap