Spectroscopy Liquid Infiltration Method for Measuring Porous Silicon Properties

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Porous silicon can be formed by electrochemical etching in hydrofluoric acid solution. Due to the large surface area and photoluminescent properties, porous silicon has attracted the interest of several areas, such as, microelectronics, optoelectronics, chemical and biological sensors, batteries, solar cells and biomedical devices. In the laboratory, porous silicon was formed by low resistivity p-type monocrystalline silicon wafers under several conditions of current density, solution concentration and etching time [1]. In order to measure the thickness, refractive index and porosity of the porous silicon layer, it was assembled in the laboratory a system that operates with the spectroscopy liquid infiltration method. This method is non-destructive and fast execution, which enables to measure the properties of the porous layers in few minutes [2]. The method consists in measuring the reflectance of the porous silicon layer immersed in two distinct media, for example, air and alcohol. The analysis of the obtained Fabry-Perot interference spectra allows to estimate the properties of the porous layer. This work presents details of the assembled system and results obtained from several samples. The results obtained with the spectroscopy liquid infiltration method were also compared with the high-resolution scanning electron microscopy data.

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References