Effect of Metal-Induced Crystallization on Porous Silicon/n-Si Hetrojunction

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ABSTRACT

In this experiment, porous silicon (PS)/n-Si structure has been prepared by using electrochemical anodization method at room temperature; then, the solution-based metal induced crystallization (SMIC) of porous silicon thin film was processed with various concentration of Nickel Nitrate at 550 °C. Au/PS/n-Si and Al/PS/n-Si structures were fabricated to investigate the influences of SMIC on PS. The process can reduce leakage current, because during the etching PS by HF, many dangling bonds existed on the surface of PS as a result of trap centers, leading to large leakage current of PS photodetectors. It was found that the Au/PS/n-Si prepared by SMIL method can reduce the leakage current by a magnitude of 219 and photo-to-dark-current ratio can be improved by a magnitude of 1052.

Keywords : electrochemical anodization method, porous silicon, Nickel Nitrate, solution-based metal induced crystallization, photo-to-dark current ratio.

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