

عنوان مقاله:

Multicrystalline Silicon Passivation by Hydrogen and Oxygen- Rich Porous Silicon Layer for Photovoltaic Cells Applications

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خلاصه مقاله:

In this work, we demonstrate the beneficial effect of introducing a superficial porous silicon layer on the electronic quality of multi-crystalline silicon for photovoltaic cell application. The porous silicon was formed using an acid vapor etching-based method. The porous silicon layer rich in hydrogen and oxygen formed by vapor etching is an excellent passivating agent for the mc-Si surface. Laser beam-induced current (LBIC) analysis of the exponentiation parameter (n) and surface current mapping demonstrates that oxygen and hydrogen-rich porous silicon led to excellent surface passivation with a strong electronic quality improvement of multi-crystalline silicon. It was found that the generated current of treated silicon by acid vapor etching-based method is 20 times greater as compared to the reference substrate, owing to recombination centers passivation of the grains and grain boundaries (GBs); The actual study revealed an apparent decrease in the recombination velocity of the minority carrier as reflected by 25% decrease in the exponentiation parameter (n) of the LBIC versus X-position measurements. These results make achieved porous silicon a good option for advancing efficient photovoltaic cells.

کلمات کلیدی:

.Multi-crystalline silicon, Laser beam induced current, Vapor etching, Oxygen and hydrogen, Passivation

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