

Low-cost approach to fabricate a local Al-doped back surface field using oxidized porous silicon as a mask and micro groove machining process

Wissem Dimassi, Haikel khamir, Brahim Bessaïs, and Hatem Ezzaouia

*Laboratoire de Photovoltaïque, Centre de Recherche et des Technologies de l'Energie, PB : 95, Hammam Lif 2050,
Tunisia*

E-mail : dimassi_inrst@yahoo.fr

Abstract:

The purpose of this work is to develop a back surface field (BSF) for industrial crystalline silicon solar cells. We present a low-cost approach to fabricate a local Al-doped back surface field for high efficiency screen-printed solar cells, using oxidized porous silicon (ox-PS) as a mask. Micro periodic fingers were opened on the porous silicon layer using a micro groove machining process. Fourier transform infrared (FTIR) spectroscopy investigations of the PS layer show the possibility to use PS as an oxide dielectric Layer. The Light Beam Induced Current (LBIC) mapping of the realized device, confirm the presence of a micro periodic back contact structure and explain why the solar cell performance with boron local-BSF diffused at the back side is impacted. As a result we found an improvement of the I-V characteristics in dark conditions and AM illumination.