

Black silicon solar cells with record 18.7% efficiency

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Scientists at Aalto University, Finland and Fraunhofer ISE, Germany report an efficiency of 18.7% for black silicon solar cells, the highest efficiency reported so far for a black silicon solar cell.

The researchers were able to apply a boron diffusion to create a pnjunction, maintaining the excellent optical properties of the black <u>silicon</u> <u>structure</u>. By applying atomic layer deposited Al_2O_3 , an effective passivation of the nanostructured surfaces was achieved. The previous efficiency record of 18.2% was held by the U.S. Department of Energy's National Renewable Energy Laboratory (NREL) using thermal oxidation as a passivating layer.

"The <u>quantum efficiency</u> measurements reveal that the nanostructured front surface is of a high electrical quality comparable to a pyramidal textured surface," says Assistant Professor Hele Savin of Aalto University.

Routes for improving the cell efficiency are already identified, and efficiencies clearly above 20% should be within reach.

The paper, 'Passivation of Black Silicon Boron Emitters with ALD Al2O3' by Päivikki Repo, Ville Vähänissi, Guillaume von Gastrow, Jan Benick, Jonas Schön, Bernd Steinhauser, Martin C. Schubert and Hele Savin, was presented in SiliconPV, the 3rd International Conference on <u>Crystalline Silicon</u> Photovoltaics, 25-27 March 2013 in Hamelin, Germany.



Provided by Aalto University

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