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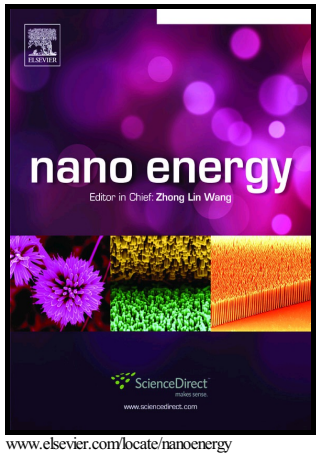

www.elsevier.com/locate/nanoenergy

PII: S2211-2855(17)30427-5
DOI: http://dx.doi.org/10.1016/j.nanoen.2017.07.014
Reference: NANOEN2072

To appear in: *Nano Energy*

Received date: 3 June 2017
Revised date: 1 July 2017
Accepted date: 6 July 2017

Cite this article as: Fengyou Wang, Shanzhen Zhao, Bofei Liu, Yuelong Li, Qianshang Ren, Rongchi Du, Ning Wang, Changchun Wei, Xinliang Chen, Guangcai Wang, Baojie Yan, Ying Zhao and Xiaodan Zhang, Silicon Solar Cells with Bifacial Metal Oxides Carrier Selective Layers, *Nano Energy* http://dx.doi.org/10.1016/j.nanoen.2017.07.014

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Abstract

Silicon heterojunction (SHJ) solar cells, constructed with hydrogenated amorphous silicon (a-Si:H) carrier-selective layers and a crystalline silicon substrate, are promising alternatives to conventional monocrystalline silicon solar cells. However, the undesirable characteristics like high parasitic light-absorption and low conductivity of the doped a-Si:H carrier limit further improvement of the performance of SHJ solar cells. In our design, MoO_x is chosen as the hole-selective layer of the silicon heterojunction solar cell to reduce the parasitic incident-light absorption. In particular, lightly boron-doped zinc oxide (ZnO:B) films with high conductivities and low refractive indices, instead of the common heavily phosphorus-doped a-Si:H (n^+-a-Si:H), are directly deposited as electron-selective layers to achieve low resistivity ohmic contact and an excellent optical back-reflectance. Compared to