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Supporting Information

## Conductive Layer Protected and Oxide Catalyst Coated Thin-Film Silicon Solar Cell as Efficient Photoanode

Ning Wang,<sup>ab</sup> Min Liu,<sup>c</sup> Junhui Liang,<sup>a</sup> Tiantian Li,<sup>a</sup> Hairen Tan,<sup>cd</sup> Bofei Liu,<sup>a</sup> Qixing Zhang,<sup>a</sup> Changchun Wei,<sup>a</sup> Ying Zhao,<sup>ab</sup> and Xiaodan Zhang<sup>\*ab</sup>

<sup>a</sup> Institute of Photoelectronic Thin Film Devices and Technology of Nankai University, Key Laboratory

of Photoelectronic Thin Film Devices and Technology, Tianjin 300071, P. R. China

<sup>b</sup> Collaborative Innovation Center of Chemical Science and Engineering (Tianjin), Tianjin 300071, P.

R. China

<sup>c</sup> Department of Electrical and Computer Engineering, University of Toronto, 35 St George Street,

Toronto, Ontario M5S1A4, Canada

<sup>d</sup> Photovoltaic Materials and Devices Laboratory, Delft University of Technology, 2628CD Delft, The

Netherlands

\*Corresponding author: Tel.: +86-22-23499304; fax: +86 22-23499304; E-mail address:

\*xdzhang@nankai.edu.cn

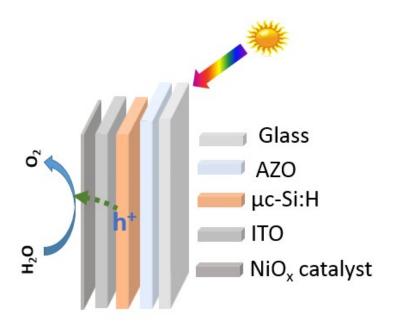


Figure S1. The scheme structure of µc-Si:H solar cell photoanode.

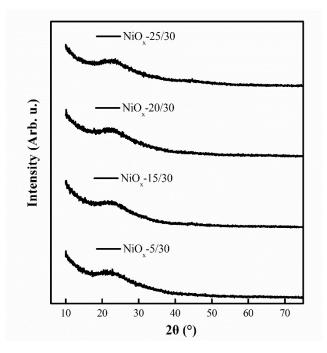
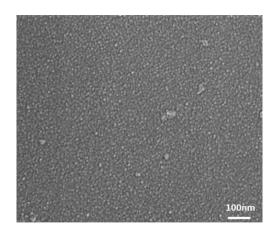
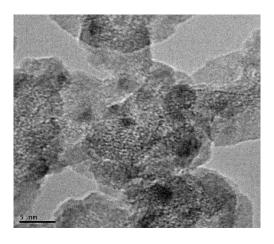


Figure S2. The XRD patterns of  $NiO_x$  catalysts with different  $O_2/Ar$ .



**Figure S3.** The surface SEM image of  $NiO_x$ -20/30.



**Figure S4.** The TEM image of  $NiO_x$ -20/30.

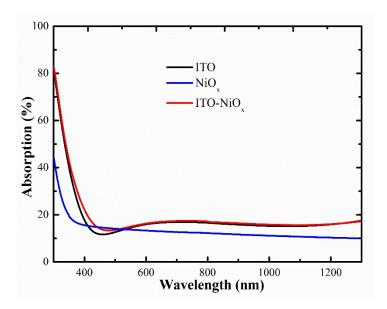


Figure S5. The absorption curves of the ITO layer,  $NiO_x$  catalyst and the combination of ITO and  $NiO_x$ -20/30 layer.

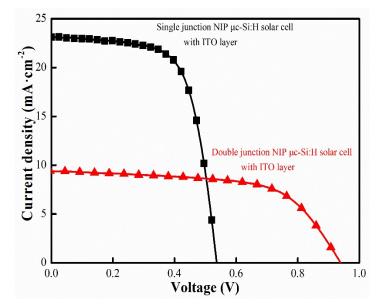


Figure S6. The I-V curves of single junction NIP and double junction NIP  $\mu$ c-Si:H solar cells with ITO layer.