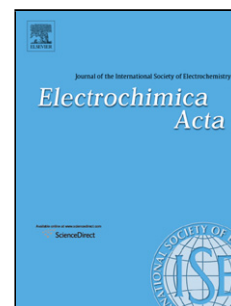


## Accepted Manuscript

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PII: S0013-4686(13)01741-6  
DOI: <http://dx.doi.org/doi:10.1016/j.electacta.2013.09.019>  
Reference: EA 21236

To appear in: *Electrochimica Acta*

Received date: 17-7-2013  
Revised date: 5-9-2013  
Accepted date: 10-9-2013

Please cite this article as: G. Yue, W. Zhang, J. Wu, Q. Jiang, Glucose aided synthesis of molybdenum sulfide/carbon nanotubes composites as counter electrode for high performance dye-sensitized solar cells, *Electrochimica Acta* (2013), <http://dx.doi.org/10.1016/j.electacta.2013.09.019>

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## Glucose aided synthesis of molybdenum sulfide/carbon nanotubes composites as counter electrode for high performance dye-sensitized solar cells

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Abstract: In our present study, the composites of molybdenum disulfide/carbon nanotubes (MoS<sub>2</sub>/CNTs) were synthesized with glucose aided (G-A) by using an in situ hydrothermal route, and proposed as counter electrode (CE) catalyst in the dye-sensitized solar cells (DSSCs) for enhancing electrocatalytic activity toward the reduction of triiodide. The MoS<sub>2</sub>/CNTs composites with tentacle-like structure were confirmed by using the scanning and transmission electron microscopy. The superior structural characteristics including large active surface area and particularly the unique tentacle-like nanostructure along with 3D large interconnected interstitial volume guaranteed fast mass transport for the electrolyte, and enabled the (G-A) MoS<sub>2</sub>/CNTs CE to speed up the reduction of triiodide to iodide. The extensive electrochemical studies by the cyclic voltammetry, electrochemical impedance spectroscopy and Tafel measurements indicated that the (G-A) MoS<sub>2</sub>/CNTs CE possessed superior electrocatalytic activity, great electrochemical stability and impressive low charge transfer resistance on the electrolyte|electrode interface (1.77 Ω·cm<sup>2</sup>) in the triiodide/iodide system compared to the pristine MoS<sub>2</sub>, MoS<sub>2</sub>/C and sputtered Pt CEs. The DSSC assembled with the novel (G-A) MoS<sub>2</sub>/CNTs CE exhibited high power conversion efficiency of 7.92% under the illumination of 100 mW·cm<sup>-2</sup>, comparable to that of the DSSC with the Pt electrode (7.11%).

Keywords: molybdenum sulfide; carbon nanotubes; glucose; counter electrode; dye-sensitized solar cell

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