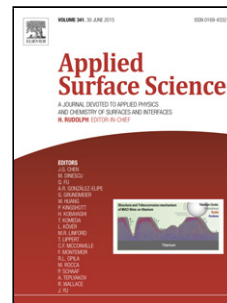


Accepted Manuscript

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PII: S0169-4332(17)31248-5
DOI: <http://dx.doi.org/doi:10.1016/j.apsusc.2017.04.212>
Reference: APSUSC 35893

To appear in: *APSUSC*

Received date: 13-12-2016
Revised date: 21-4-2017
Accepted date: 25-4-2017

Please cite this article as: Hui Chen, Jinfeng Wang, Chenchen Jia, Junpeng Mou, Lei Zhu, Highly efficient dye-sensitized solar cell with a novel nanohybrid film of $\text{Cu}_2\text{ZnSnS}_4$ -MWCNTs as counter electrode, *Applied Surface Science* <http://dx.doi.org/10.1016/j.apsusc.2017.04.212>

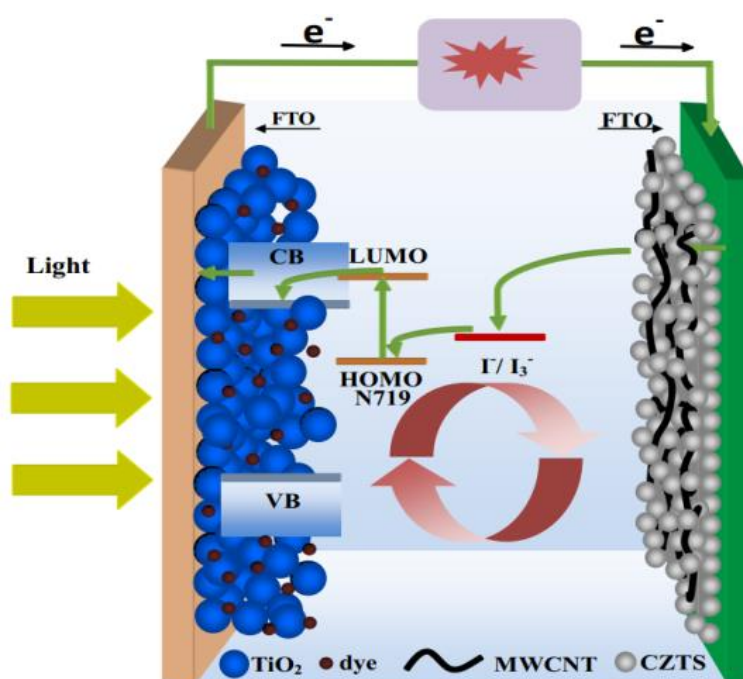
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Highly efficient dye-sensitized solar cell with a novel nanohybrid film of $\text{Cu}_2\text{ZnSnS}_4$ -MWCNTs as counter electrode

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Graphical abstract



Highlights

- A new structure CZTS-MWCNTs film as composite CE was fabricated via a spin coating process.
- A novel DSSC was also constructed with DS-TiO₂ films as the photoanode and CZTS-MWCNTs films as the composite CE.
- CZTS NPs were synthesized by a low-cost solvothermal process to high-efficiency solar cells.
- The prepared cell achieve efficiency as high as 9.04 % which is similar to conventional Pt-based DSSC (8.74 %).

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