

Electrospun metal oxides nanostructures for energy related devices

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ABSTRACT:

Metal oxide nanostructures of wide bandgap semiconductors with various morphologies, high degree of crystallinity and surface properties were fabricated by electrospinning a polymeric solution containing respective metal ions and their controlled heat treatment. The metal oxide nanostructures thus developed were tested for their application as charge separation and transport medium in solar cells, cathodes for low voltage (2 V) lithium ion batteries, and super capacitors. The solar cells thus fabricated features enhanced electron diffusion coefficient and energy storage devices featured stable electrochemical cycling thereby making electrospun metal oxide nanostructures a viable product for next generation energy industry.

KEYWORDS:

Electrospinning; Metal oxide semiconductors; Dyesensitized solar cells; lithium ion batteries; supercapacitors

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REFERENCES

1. S. Ramakrishna, R. Jose, P. S. Archana, A. S. Nair, R. Balamurugan, J. R. Venugopal, W. E. Teo, J. Mater. Sci. 45 (2010) 6283-6312 .
2. W. E. Teo, S. Ramakrishna, Composites Sci.Technol.69 (2009) 1804- 1817
3. D. H. Reneker, A. L. Varin, Polymer 49 (2008) 2387-2425.
4. R. Ramasheshan, S. Sundarrajan, R. Jose, S. Ramakrishna, J. Appl. Phy. 102 (2007) 111101.
5. M. A. Green, K. Emery, D. L. King, Y. Hoshikawa, W. Warta, Prog. Photovolt: Res. Appl. 15 (2007) 35-40.

