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Nanotechnology for Clean and Sustainable Energy Production

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With the exponential increase of the demand for clean and sustainable energy sources, nanotechnologies are being explored to provide cost-effective and environmentally clean solutions to the world's energy problems. Nanostructured materials attracted a great deal of attention due to their unique ability to manipulate light and control energy flow at the atomic level. Most of the next generation solar cells are based on the nanostructured materials as they exhibit great promise of new routes for converting solar energy into electrical energy. However, there are still many challenges that need to be addressed before they can be fully utilized for practical applications. The talk will describe the approaches adopted in developing dye solar cell and solar powered hydrogen production unit using simple, low cost, solution-based deposition, atmospheric pressure and low temperature processing with compatibility for the flexible substrates and large-area solar panel. The use of hierarchically structured nanocomposite, core shells and graphene-based photoelectrode, scattering and blocking layer, can also offer new opportunities to design more efficient solar cells by facilitating electron collection, transport and photon absorption.

Keywords: *dye solar cell, photoelectrochemical cell, hydrolysis, electrolyte, graphene, photocatalyst*

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