

Sustainable Energy: Challenges and Opportunities

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Nanotechnology in Photovoltaics

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Photovoltaics has the chance of being one of the important players in future energy scenarios. However, current technologies are intrinsically inefficient or quite expensive, and a true technological breakthrough is yet to come - although it might be just around the corner. The state of the art in photovoltaics will be reviewed, describing the fundamental limitations of current technologies and how “third generation” technologies are overcoming such limitations: It will be shown that all new approaches are based on engineering devices and materials at the nanoscale, as this is the scale where the key mechanisms that govern the photovoltaic effect operate. Nanotechnology and biotechnology are the tools of choice for such endeavor; One approach based on a novel class of photovoltaic nanostructured materials synthesized via low-cost colloidal chemistry techniques, currently being developed in the labs of the University of Trieste, will be described in more detail.

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