

Sustainable Energy: Challenges and Opportunities

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Plastic solar cells

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Recently, polymer or 'plastic' solar cells have attracted significant interest due to their potential for cheaper generation of electricity compared with conventional inorganic solar cells.¹ This expectation is based on simple device structure and on inexpensive wet-processes such as screen printing, ink-jet printing, spray coating, etc. Other advantages of plastic solar cells are low specific-weight, mechanical flexibility, and easy tenability of chemical properties of organic materials.

To date, most of high efficiency polymer solar cells employ a bulk heterojunction ² nanostructure made of an electron-donating conjugated polymer and an electron-accepting soluble fullerene. Currently, the efficiency that can be reached with this kind of cells exceeds 7%,³ while the predictions of the theoretically and practically accessible power conversion efficiencies are indicated to be around twice that value or even more for tandem device structure.⁴

In this lecture, some basics as well as the recent developments in this novel photovoltaic technology are presented.

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