

A special issue on solar cells

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The increasing demand for renewable energy has made the solar cell technology as one of the most significant research and development areas of today. Silicon based solar cells are the dominant photovoltaic products at the present time, but the relatively high costs are barriers for their broad applications. Research has been active worldwide in developing other photovoltaic technologies that use cheap materials and can be easily manufactured. Organic solar cells have attracted a lot of interests recently due to their potential to be low cost photovoltaic technologies. This special issue of the *Frontiers of Optoelectronics in China* has collected research articles by a number of Chinese and international experts. It is aimed to broaden the readers' view about some of the recent developments and challenges in this important R&D field. Thirteen excellent papers are in this special issue including 4 review articles and 9 research articles.

Hot topics in intermediate-band solar cells, bulk heterojunction solar cells and dye-sensitized solar cells, are reviewed in this special issue. Jun Yang et al. reviewed intermediate-band solar cells based on dilute alloys and quantum dots; Chang-Qi Ma shed lights on conjugated dendritic oligothiophenes for solution-processed bulk heterojunction solar cells; Wei Chen and Shihe Yang reviewed recent systematic studies of using ZnO nanotetrapods for photoanodes of dye-sensitized solar cells in their group; Besides, Hong Lin et al. reviewed electrolyte-dependent photovoltaic responses in dye-sensitized solar cells.

There are nine original research articles in dye-sensitized solar cells. Jianwei Liu and Jun Li developed an electrochemical method to analyse dye absorption on the aligned carbon nanofiber arrays coated with TiO₂ nanoneedles for dye-sensitized solar cells; Effects of annealing temperature, time of nanocrystalline TiO₂ film on characterizations of dye-sensitized solar cell were investigated by Nam-Gyu Park's group; Qingbo Meng's paper described a strategy of surface modification to the mesoporous TiO₂ photoanode with hydrochloric acid treatment; Songyuan Dai and co-workers studied electron transportation and optical properties of TiO₂ films; Effect of deoxycholic acid on the performance of dye-sensitized solar cell based on black dye was presented by Zhong-Sheng Wang et al; Zhen Li and his colleagues developed a new pyrrole-based conjugated oligomer as organic dye for dye-sensitized solar cells; Jun Zhang and Chengchun Tang demonstrated quantum dot photoelectrochemical solar cells based on TiO₂-SrTiO₃ heterostructure nanotube array scaffolds; Tingli Ma's group find a method to obtain high-efficient and low-cost dye-sensitized solar cells; Finally, a novel flexible solar cell based on PCBM/P3HT heterojunction was fabricated by Jihuai Wu and co-workers.

Overall, articles in this special issue showcase the exciting achievements of solar cell technologies. We have more reason to believe solar cells would be one of the most promising renewable energy technologies for years to come.

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