

Editorial

Photoenergy: Progress in Si-Related Solar Cells for a Low Cost and High Efficiency

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As the global effort dedicated to “sustainable growth and a low-carbon society” has increased, so have the opportunities and challenges for renewable energy technologies, like photovoltaic solar cells. A great amount of investment in solar cells research and subsequent technical break-throughs has been witnessed in the last decade, with the promise of further improvements to both performance and affordability expected. The overwhelming majority of commercially available solar cells remain silicon based, a situation not expected to change in the near-to-medium term due to silicon’s abundance and compatibility with existing large-scale electronics manufacturing technologies.

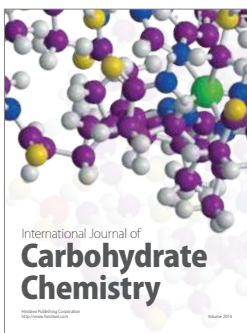
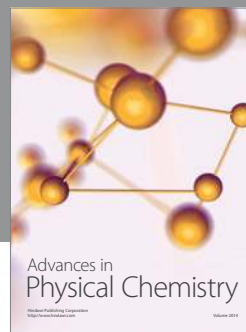
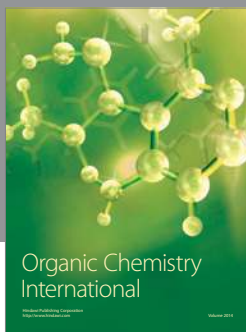
Far from being a fully mature and settled field of research, silicon-based photovoltaics remains dynamic with ever increasing innovations being developed in terms of performance and lowered production costs being reported. Silicon’s preeminence in photovoltaics, and the diverse approaches being pursued in photovoltaics in general are reflected in this special issue that is composed of the following selected topics: silicon solar cell devices and technologies, solar cell Process and production-related materials, device and process-related characterizations, Low Cost-related material, device and process, High efficiency approaches and technologies, and other novel solar cell materials and devices.

The articles collected together in this special issue have been sourced in two ways; firstly, roughly half of the articles were presented during the Global Photovoltaic Conference

2011 (GPVC 2011) that was held at Busan, Republic of Korea, in September 2011. Around 300 papers were presented at this conference, with outstanding presentations invited to be submitted as full-length version manuscripts for this special issue. Secondly, an open call was made to the photovoltaics community to submit new and interesting results related to, but not restricted to, silicon-based photovoltaics. The high standard expected is reflected in that only approximately one-third of submitted manuscripts were accepted for publication in this issue.

The range of topics considered in the papers is considerable, spanning numerical studies of conventional crystal growth technologies, novel production methods for conventional silicon solar cells, nanoinspired architectures, dyesensitized approaches, and even a new characterization approach based on microplasma analysis. We, the editorial team, expect, due to the high quality of the articles included in this issue, that not only will good representation of the state of research in silicon based photovoltaics be achieved, but further efforts will be spurred on by the discoveries reported.

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