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Current status of solution processable organic polymers and small molecules for bulk-heterojunction solar cells

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Solution processed bulk heterojunction (BHJ) organic solar cells (OSCs) have gained wide interest in past few years and are established as one of the leading next generation photovoltaic technologies for low cost power production. Power conversion efficiencies up to 6% and 6.5% have been reported in the literature for single layer and tandem solar cells, respectively using conjugated polymers. A recent record efficiency of about 8.13% with active area of 1.13 cm^2 has been reported. However solution processable small molecules have been widely applied for photovoltaic (PV) devices in recent years because they show strong absorption properties, and they can be easily purified and deposited onto flexible substrates at low cost. Introducing different donor and acceptor groups to construct donor-acceptor (D-A) structure small molecules has proved to be an efficient way to improve the properties of organic solar cells (OSCs). The power conversion efficiency of about 4.4% has been reported for OSCs based on the small molecules.

This lecture deals with the recent progress of solution processable D-A structure small molecules and discusses the key factors affecting the properties of OSCs based on D-A structure small molecules: Sunlight absorption, charge transport and the energy level of the molecules.

Biography

Presently, G. D. Sharma is working as Director (Academic and Research), JEC group of Colleges, Jaipur. Prof. Sharma obtained his Ph.D. degree from Indian Institute of Technology, Delhi in 1985 on Electronic Materials of Electronics and Optoelectronics Devices. In the same year, he had joined as Assistant Professor at JNV University, Jodhpur and promoted as Professor in 2004. He worked as PDF in State University of New Jersey, USA for 2 year and six months during 1990-1992 under the BOYCAST Fellowship awarded by Department of Science and Technology, Govt. of India. He had been awarded Young Scientist Award by DST, Govt. of India in 1993. His area of research interest is conjugated polymers and small molecules for solar cell applications and dye sensitized solar cells based on metal free dyes. He has supervised 14 Ph.D. students and about more than 40 M.Sc. students. He has published more than 120 research papers in international journals with high impact factor. He has traveled to USA, Europe, Singapore, Egypt and delivered many lectures. He has national and international research collaborations with Defence Laboratory, Jodhpur; IIT, Roorkee; IICT, Hyderabad; Indian Institute of Science, Bangalore; University of Patra, University of Crete, Greece; National Institute of Material Science, Japan; National University of Singapore, Singapore and Benha University, Egypt. He has completed many research projects of DST, DRDO, CSIR, Govt. of India. He is in the reviewer committee of the project evaluation of DST, Govt. of India. He is the reviewer of many international journals.

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Effect of raw material on spheroidal graphite cast iron: In supply chain management

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Spheroidal graphite cast iron (sg iron) is one of the types of cast irons, which is having a high carbon containing iron base alloy, in which the graphite is present in compact, spheroidal shape rather than the shape of flakes. The objective of this paper is to show 1) the importance of quality of raw material to prepare the sg iron castings 2) the effect of magnesium, silicon and inoculant's on the microstructure of different grades of sg iron 3) the effect of various quantities of inoculants addition and pouring temperature on microstructures of sg iron castings 4) this paper also presents the supply chain management in the foundry unit. This study is done in an automobile foundry industry.

Biography

Shyam Sunder Rao Sirivolu has completed B.Tech (Metallurgy), M.Tech (Industrial Engineering), MBA (Production & Operations Management) and is pursuing Ph.D. in supply chain management in the foundry industry from Jawaharlal Nehru University. He worked for 11 years in the foundry industry, which manufactures automobile parts. He is the Associate Professor in VNR Vignana Jyothi Institute of Engineering and Technology, India. He published and presented the papers on supply chain management in various premier colleges in India.

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