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New photovoltaic polymers for efficient organic solar cells

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Polymer solar cell (PSC) has attracted much attention due to its potential application in production of large area, light weight and flexible panels. In order to improve power conversion efficiency (PCE) of PSC, more and more new materials were designed and synthesized and their properties. In these new materials, benzo[1,2-b:4,5-b']dithiophene (BDT) based conjugated polymers exhibited very promising photovoltaic properties. In our recent works, photovoltaic properties of BDT-based conjugated polymers were tuned through molecular structure design. Functional groups or conjugated components with strong electron-withdrawing effect were introduced into the BDT-based polymers, and HOMO level of the BDT-based polymers can be lowered effectively without sacrificing absorption area and hole mobility. Therefore, higher open circuit voltage (Voc), good short circuit voltage (Jsc) and fill factor (FF) were recorded, and hence ~10% PCE can be realized. These results indicate that two-dimensional structure is an effective way to enhance photovoltaic properties of the BDT-based conjugated polymers. In this presentation, the synthesis process and photovoltaic properties of the newly designed BDT-based materials will be introduced in detail.

Biography

Jianhui Hou, PhD is a Professor at the Institute of Chemistry, Chinese Academy of Sciences (ICCAS). In 2006, he got his PhD degree at ICCAS; during 2006-2008, he worked at UCLA as the Post-doctoral Researcher; during 2008-2010, he worked in Solarmer Energy Inc. as the Director of the research division. At the end of 2010, he joined ICCAS and built a research team. His research focuses on organic photovoltaic materials. In the past few years, he has co-authored >100 papers in peer-reviewed journals and published 18 patents.

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