Agnieszka Pron, Organic Chem Curr Res 2018, Volume:7
DOI: 10.4172/2161-0401-C1-022

Development of materials for OPV applications

Agnieszka Pron
Merck Chemicals Ltd., UK

Over the last decade, an enormous progress has been made in the field of organic photovoltaics (OPV). Reported power conversion efficiencies (PCE) increased from 2% to over 13%. OPV technology is now making a successful transition from being a purely academic pursuit to being implemented in high-visibility, functional projects across the globe. Dedicated and coordinated research and development in both academic and industrial research labs is making possible the vision of OPV as a feasible & scalable energy harvesting solution. The easiest and most efficient approach to high yielding OPV is based on bulk-heterojunction (BHJ) concept where an active layer consists of mixture of donor and acceptor materials promoting exciton dissociation and effective charge separation. In classic approach, conjugated polymers play a role of a donor, whereas fullerene derivatives (such as $PC_{60}BM$ or $PC_{71}BM$) that of an acceptor. Moreover, it was recently shown, that it is possible to replace PCBM by ladder type small molecules acceptor and achieve efficiencies exceeding 12%, with a theoretical limit of 20%. Without doubt, pi-conjugated materials are key for success of OPV. At Merck, we focus on the design, synthesis and testing of novel donor and acceptor materials for OPV applications. During this talk, I will not only present our current work in OPV field but also, I will provide an insight into design rules for novel materials.

Recent publications

1. Berny S, Blouin N, Distler A, Egelhaaf H-J, Krompiec M, Lohr A, Lozman O R, Morse G E, Nanson L, Pron A, et al (2016) Solar Trees: First Large-Scale Demonstration of Fully Solution Coated, Semitransparent, Flexible Organic Photovoltaic Modules. Advance Science 3 (5): 1500342.
2. Bura T, Beaupre S, Legare M-A, Fontaine F-G, Pron A, Leclerc M, et al (2017) Direct heteroarylation polymerization: guidelines for defect-free conjugated polymers. Chemical Science (8):3913-3925.
3. Stephen M, Morse G E, Blouin N, Lozman O, Genevicius K, Juska G (2016) The effect of polymer solar cell degradation on charge carrier dynamics in benzothiophene-diketopyrrolopyrrole polymers. Materials Chemistry and Physics (183): 485-489.

Biography

Agnieszka Pron studied Chemistry at Adam Mickiewicz University in Poznan, Poland and at Lund University, Sweden. She completed her PhD studies at Max Planck Institute for Polymer Research in Mainz, Germany where she worked on synthesis of novel triarylboranes under the guidance of Prof. K Muellen. After short stay as a Postdoctoral Researcher in Prof. M Leclerc group at Laval University in Quebec, Canada, she joined Merck Chemicals Ltd., UK in 2013 where is currently leading organic photovoltaics chemistry team.

agnieszka.pron@merckgroup.com

Notes: