

December 2015

**ADVENT Technologies at the 2015 MRS Fall Meeting and Exhibit.  
Boston Massachusetts - USA. 29 November – 4 December 2015.**

On behalf of ADVENT Technologies, Dr. Vasilis Gregoriou was participated in the 2015 MRS Fall Meeting and Exhibit at Boston Massachusetts (<http://www.mrs.org/fall2015/>) with a poster presentation entitled "**Ultra Low Band Gap  $\alpha$ - $\beta$ -unsubstituted BODIPY-based Copolymer For Near-Infrared Organic Photovoltaic**".

Enormous research efforts into organic light-emitting diodes and organic photovoltaics during the last 5 years have created a broad base of **organic optoelectronic materials**. Organic electronics is now on the way to the first commercially successful applications. While emission in the NIR can also be efficiently attained by the exploitation of colloidal, inorganic quantum dots, these are usually based on elements (Pb, Se, Cd etc.) that are much more toxic than organic compounds, which are therefore better suited, both from a general "sustainability" point of view, and, specifically, for applications in the biomedical area.

Taking this into consideration, ADVENT presented the synthesis of a new ultra low band gap (LBG)  $\alpha,\beta$ -unsubstituted BODIPY-based conjugated polymer by conventional cross coupling polymerization techniques (Stille cross coupling) for the first time. The polymer exhibits a panchromatic absorption spectrum ranging from 300 nm to 1100 nm and an optical band gap ( $E_g^{opt}$ ) of 1.15 eV, suitable for near infrared (NIR) organic photovoltaic applications as electron donor. Preliminary power conversion efficiency (PCE) of 1.1 % in polymer:[6,6]-phenyl-C<sub>71</sub>-butyric acid methyl ester (PC<sub>71</sub>BM) 1:3 weight ratio bulk heterojunction (BHJ) solar cells has been achieved, demonstrating very interesting and promising photovoltaic characteristics, such as good fill factor (FF) and open circuit voltage ( $V_{oc}$ ). These results showing that by the proper chemical design, new  $\alpha,\beta$ -unsubstituted BODIPY-based NIR copolymers can be developed in the future with suitable energy levels matching those of PC<sub>71</sub>BM towards more efficient NIR organic photovoltaics (OPVs).

*Advent Technologies is a world leader in the development of new materials and systems for energy applications. Advent Technologies is headquartered in Cambridge, MA, USA. The company also occupies research and development space in Patras, Greece where pilot manufacturing is taking place.*

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