

**Name of the Technology:** Process for Synthesis of Fullerene Acceptors for Organic Solar Cells

**Brief Summary:** The existing [6,6]-phenyl-C<sub>61</sub>-butyric acid methyl ester (PC<sub>61</sub>BM) and the new acceptor molecule [6,6]-phenyl-C<sub>61</sub>-butyric acid pentyl ester (PC<sub>61</sub>BP) are prepared via a cost-effective route. More particularly, the present invention relates to a process for the preparation of fullerene acceptors under aerobic conditions (in air), showing performance equivalent to the state of the art. More importantly, this process enables the low-cost synthesis of PC<sub>61</sub>BM and PC<sub>61</sub>BP in good yield without involving harmful or expensive catalysts or chemicals, thereby reducing the overall production cost.



Fig.: Different Acceptor and Donor Materials for Device Fabrication

**Applications:** Organic electronic applications such as Organic Solar Cells, Perovskite Solar Cells, Photo detectors, Field-Effect Transistors, Flexible and Printed Electronics, Electron Transport Layers (ETLs) in Optoelectronic Devices, etc

**Novelty Features:** A unique aerobic (air-based) preparation method for fullerene acceptors that achieves performance comparable to state-of-the-art materials.

**Advantages:** A cost-effective, environmentally friendly synthesis of PC<sub>61</sub>BM and PC<sub>61</sub>BP in good yield without the use of harmful or expensive catalysts, reducing overall production cost.



### Technology Readiness Level:

Idea	Concept Definition	Proof of Concept	Prototype	Lab Validation	Technology Development	Technology Demonstration	Technology Integrated	Market Launch

### IPR Details:

Foreign Patent Title: Cost effective and Eco-friendly Process for the synthesis of [6,6]-phenyl-C61-butyric acid pentyl ester (PC61BP) under aerobic

Inventor(s): Rachana Kumar, Samya Naqvi, Neha Gupta, Suresh Chand

Foreign Application Date: 18.02.2016

Foreign Application Number: 15/047,342

Foreign Grant Date: 13.06.2017

Foreign Patent Number: US 9,676,707 B2

**Broad Area / Category:** Energy

**User Industries:** Organic electronic device fabrication companies