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## New 1,7-Di-*tert*-butyl-4,9-bis(phenyl)-2,3,6,7-tetrakis(phenyl)-2,3,6,7-tetrakis(phenyl)perylene-3,4,9,10-tetracarboxylic diimides as Molecular Acceptors for Organic Solar Cells

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## Abstract

Two perylenediimides (PDIs), **PT** and **PT2**, functionalized with thiophene heterocycles on the 1,7-positions of the bay region were synthesized and utilized in inverted bulk-heterojunction (BHJ) polymer solar cells as acceptors in the photoactive layer. The synthesized PDIs were thermally stable up to 453 °C and soluble in chlorinated solvents such as dichloromethane and chloroform. **PT** or **PT2** was blended with poly[4,8-bis(5-ethylhexyl)thiophene-2,5-diyl]benzo[1,2-b:4,5-b']bithiophene-2,6-dicarboxylic acid (PCE-10) as a donor material. The inverted BHJ solar cell fabricated using the **PCE-10/PT** photoactive layer showed the highest power conversion efficiency (PCE) of 2.06%. Film morphology studies of **PCE-10/PDI** blends revealed a relationship between the film nanostructure and device performance.

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- Ramasamy Ganesamoorthy, Rajagopalan Vijayaraghavan and Pachagounder Sakthivel, Perylene-Diimide Based Donor-Acceptor Donor Type Small-Molecule Acceptors for Solution-Processable Organic Solar Cells, *Journal of Electronic Materials*, 10.1007/s11664-017-5706-3, **46**, 12, (6784-6794), (2017).  
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```