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Covalently Bound Clusters of Alpha-Substituted PDI-Rival Electron Acceptors to Fullerene for Organic Solar Cells

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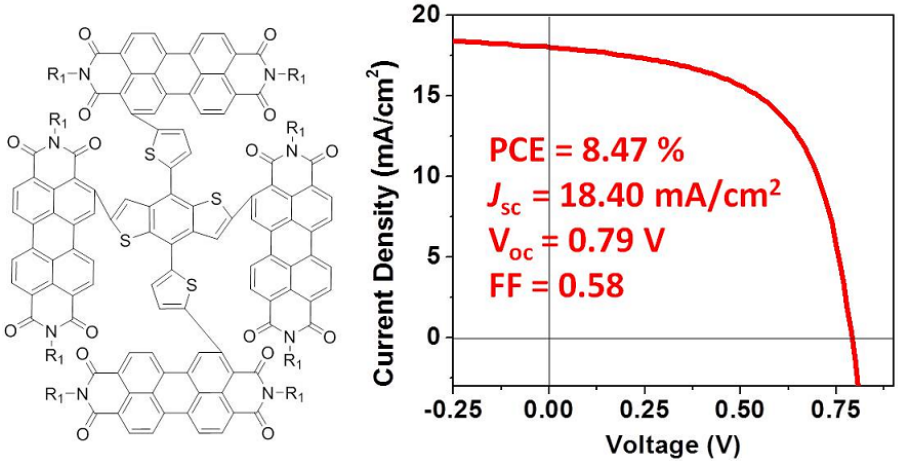

Caption: *Molecular structures of αTPB and J-V curves of binary solar cells (PTB7-Th:α TPB).*

Scientific Achievement

A cluster type of electron acceptor, TPB, bearing four α-perylenediimides (PDIs), was developed, in which the four PDIs form a cross-like molecular conformation while still partially conjugated with the BDT-Th core. The blend TPB:PTB7-Th films shows favorable morphology and efficient charge disassociation. The inverted solar cells exhibited the highest PCE of 8.47% with the extraordinary high Jsc values (>18mA/cm^2), comparable with those of the corresponding PC71BM/PBT7-Th based solar cells.

Significance

This is one of the best non-fullerene electron acceptors. It will offer opportunity to further explore its potential in combination with different types of electron door polymers so that the PCE can be further enhances.

Citation

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