

جامعة الملك عبدالله للعلوم والتقنية King Abdullah University of Science and Technology **Dissecting the Structure-Stability Relationship of Y-Series Electron Acceptors for Stable Organic Solar Cells Under Real-World Operating Conditions**

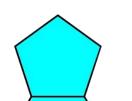
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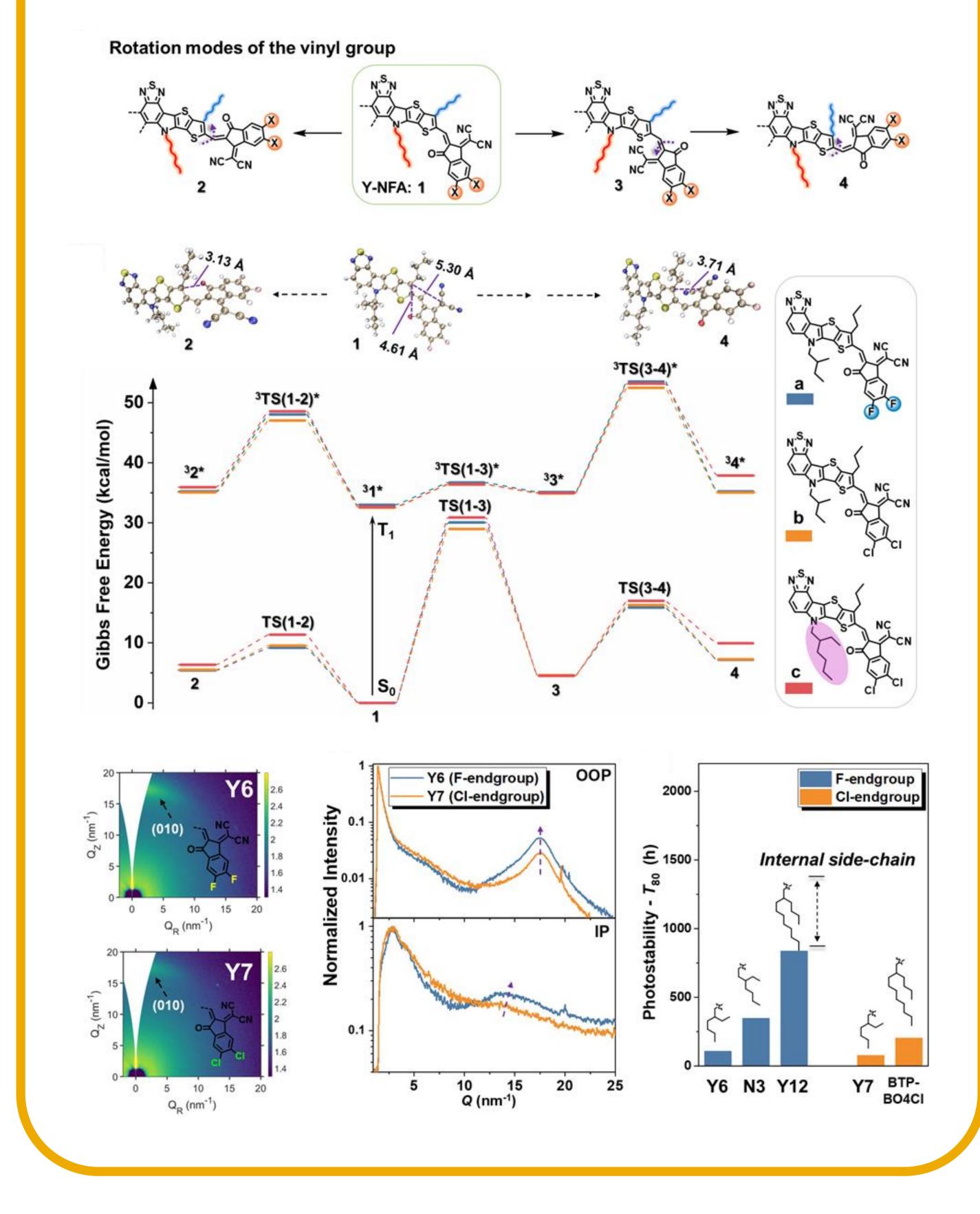
Background

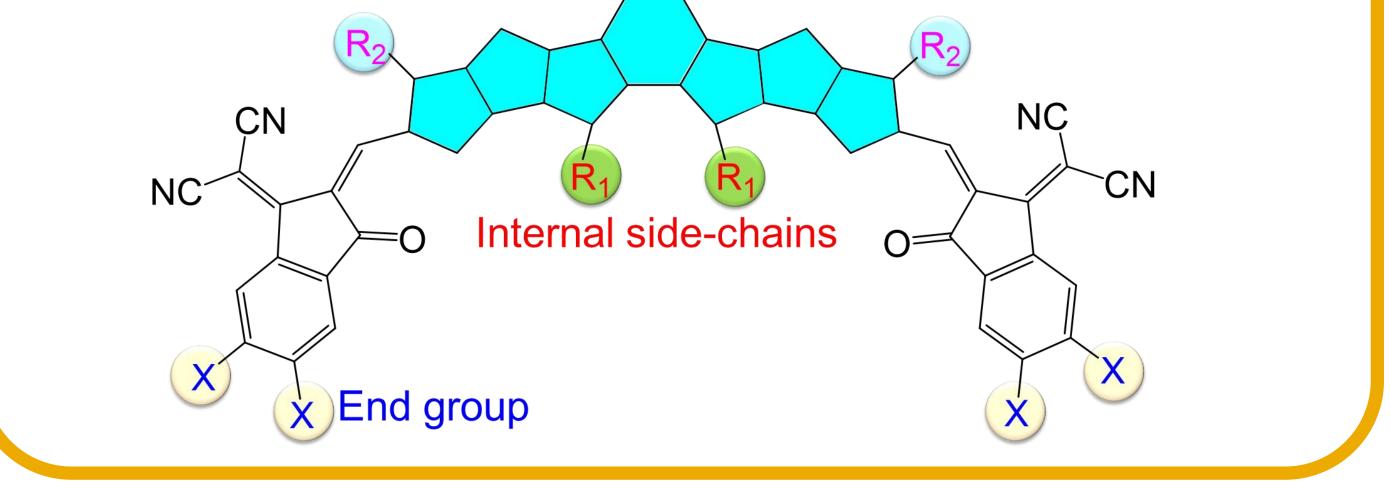
In photovoltaics, cost, efficiency, and stability are three key factors. Most high-efficiency organic solar cells are based on Yseries acceptors. Great effort has been made on the structural modification for high efficiency. The relationship between structure and device stability needs to be unveiled.

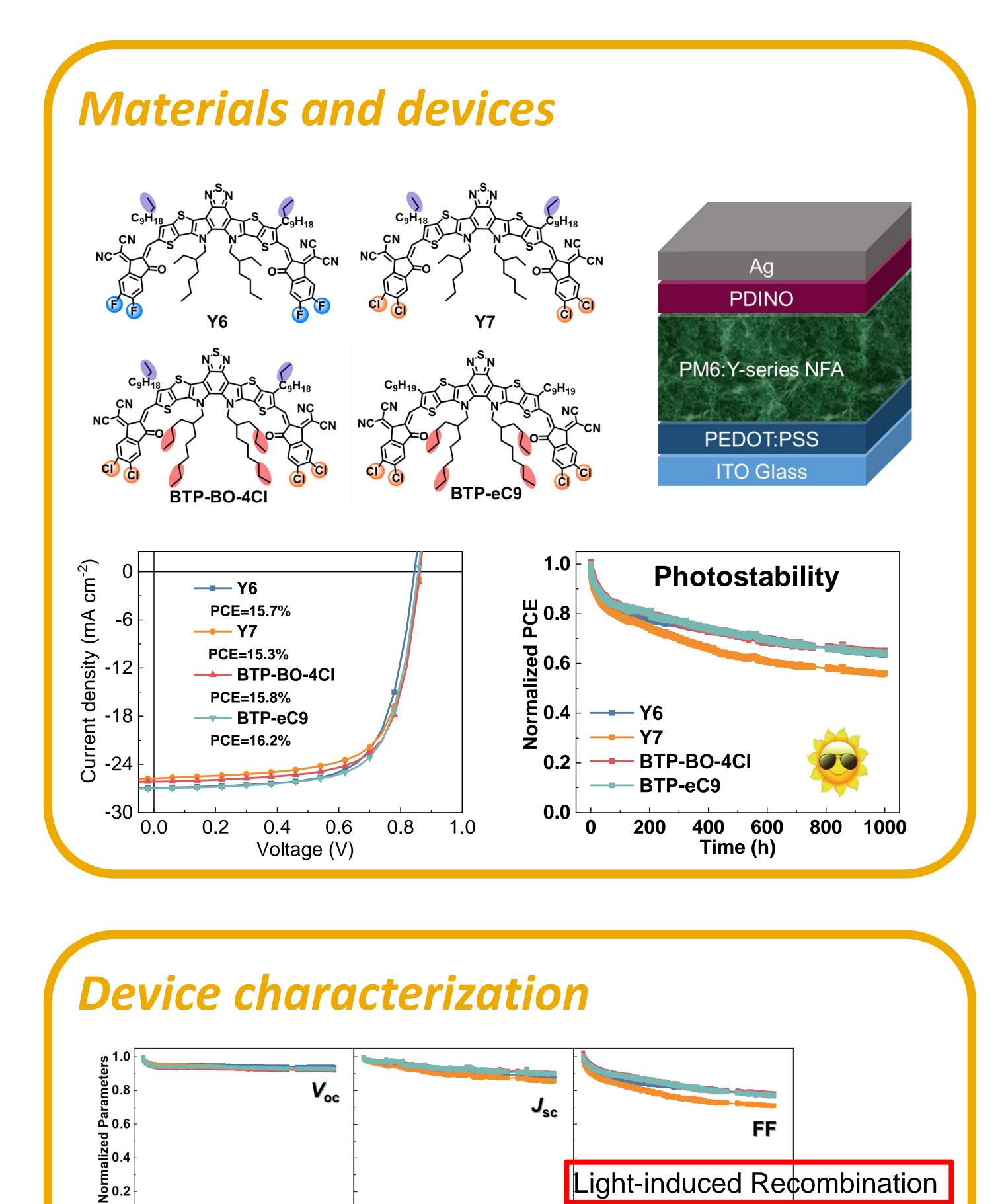
Outer side-chains



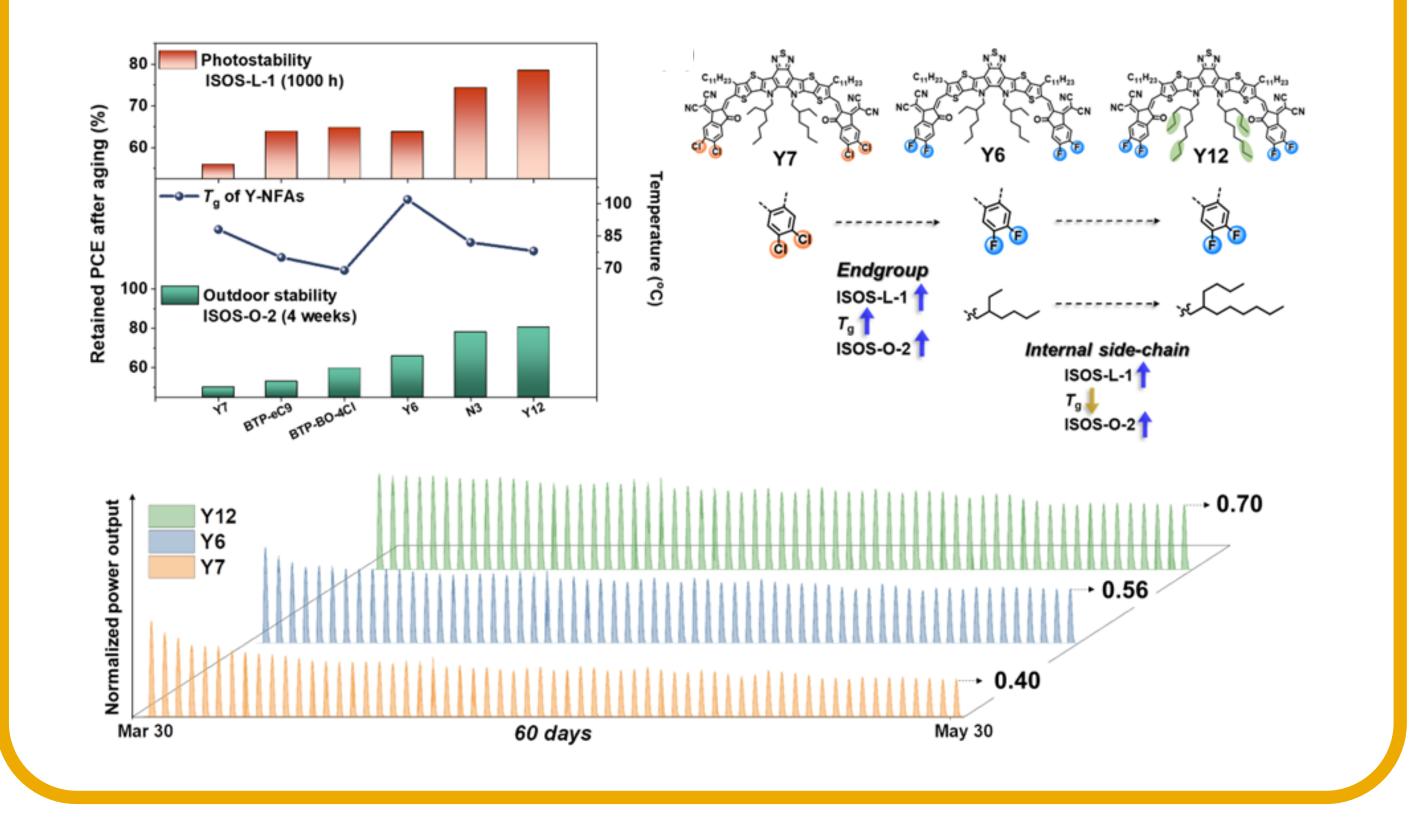
Photoisomerization



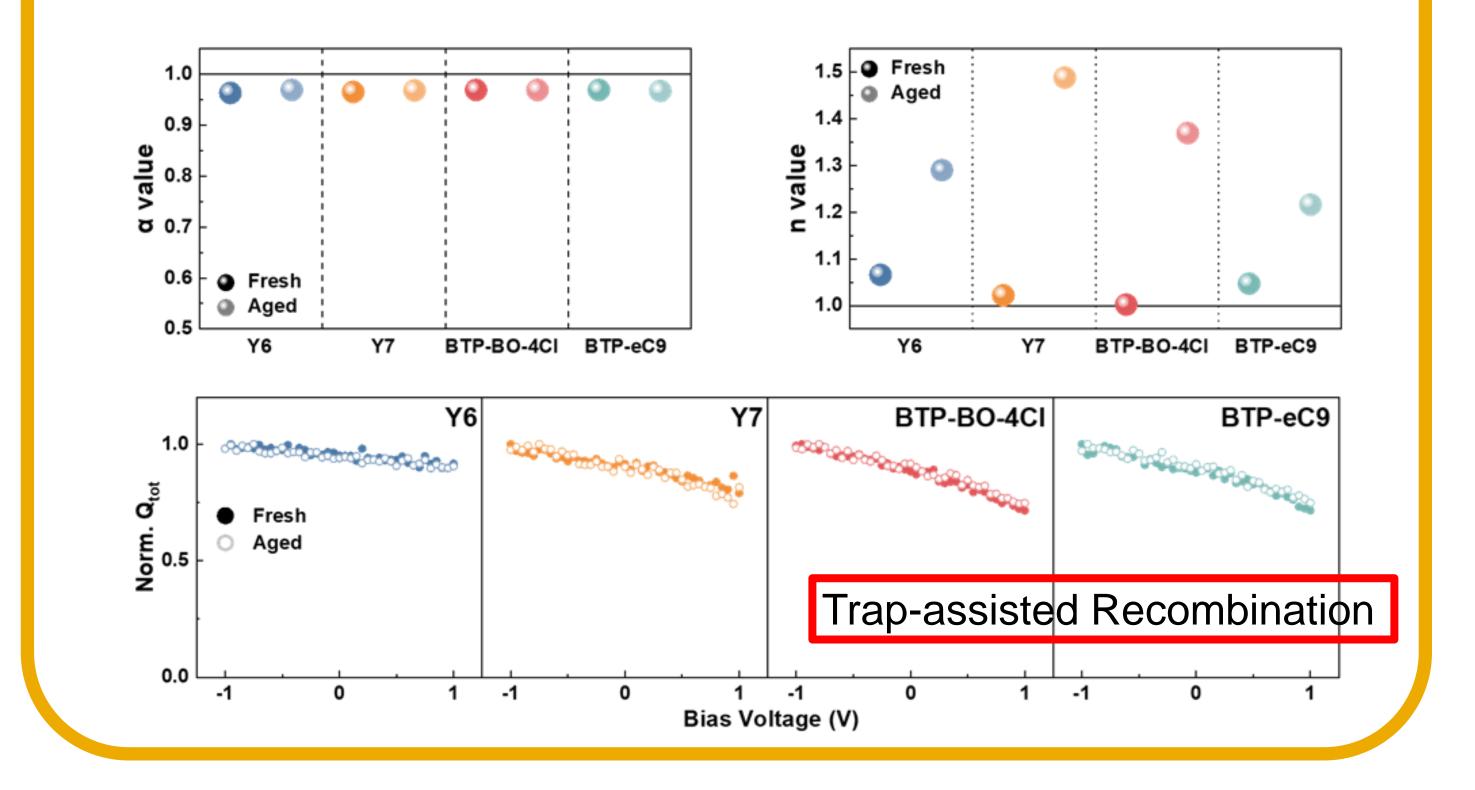




Outdoor performance



Conclusion



0.0

200

600

Time (h)

800

1000

200

400

600

Time (h)

800

1000

Time (h)

- Trap-assisted recombination is the major reason for photodegradation.
- Longer internal side chain and F-end-group will reduce the photoisomerization process, which will further improve the device lifetime.
- Outdoor stability behavior of Y-series devices has a strong correlation with their photostability behavior.