Unidirectional Benzidinium hybrid perovskite as photoinduced electron transfer photocatalyst

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Introduction

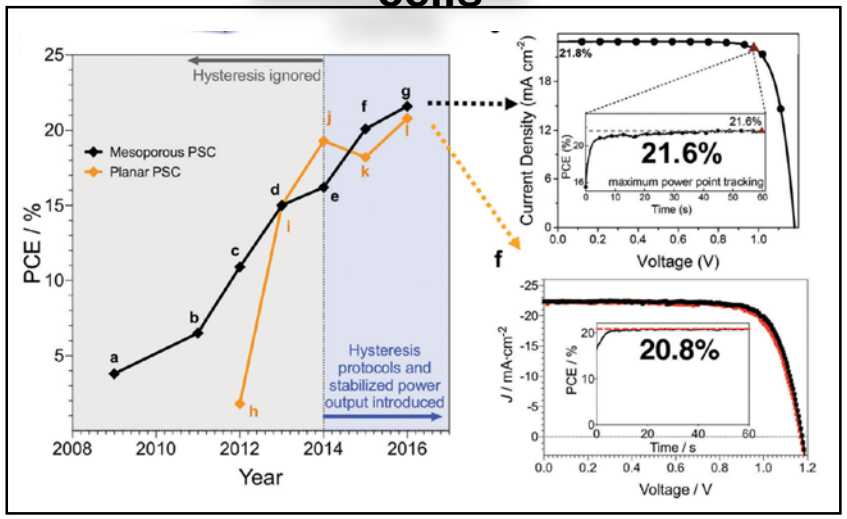
Advantages of hybrid perovskite

(1) excellent charge separation efficiency

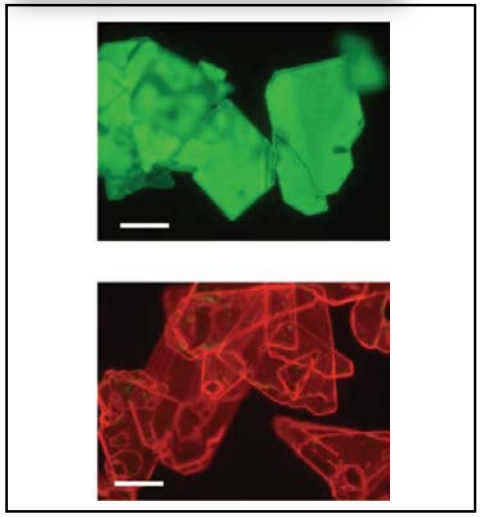
(2) Hight charge mobility

(3) Easy modulation of chemical and physical properites

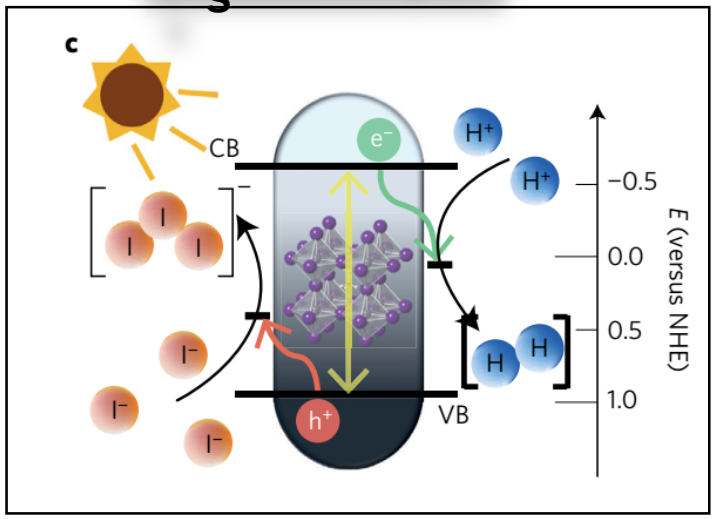
Solar cells



Light emission

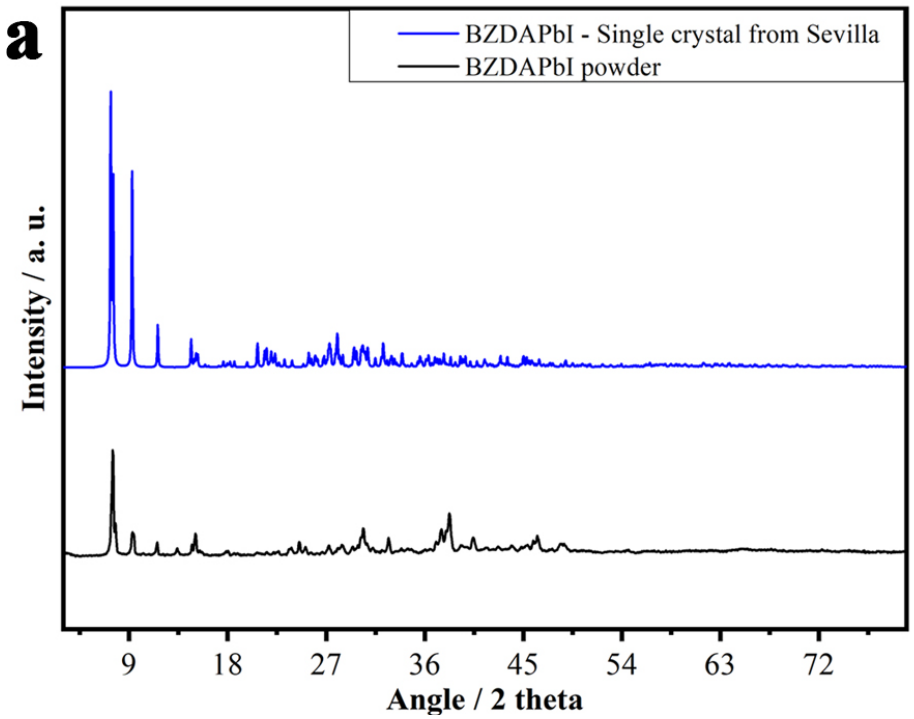


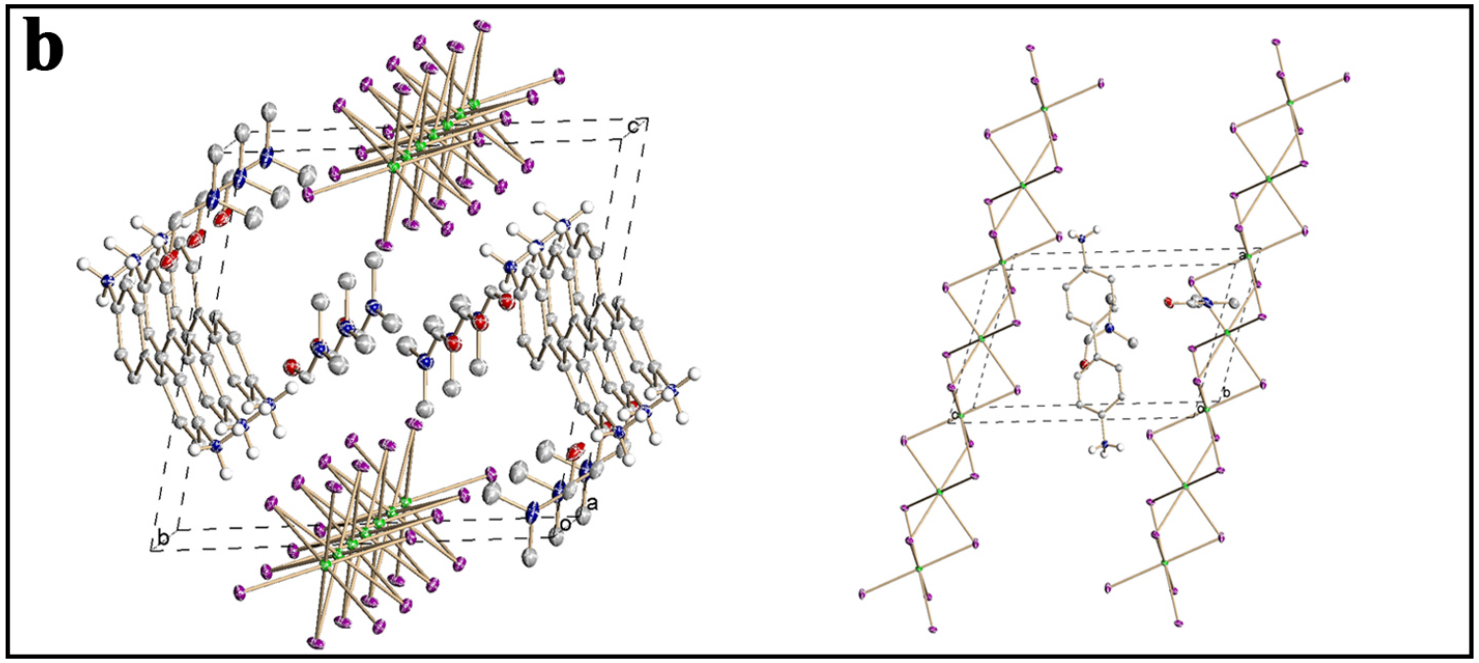
photocatalysis



Objective: synthesize a novel perovskite using benzidinium diiodide as the organic ligand to adjust the optoelectronic properties and then explore its photocatalytic application

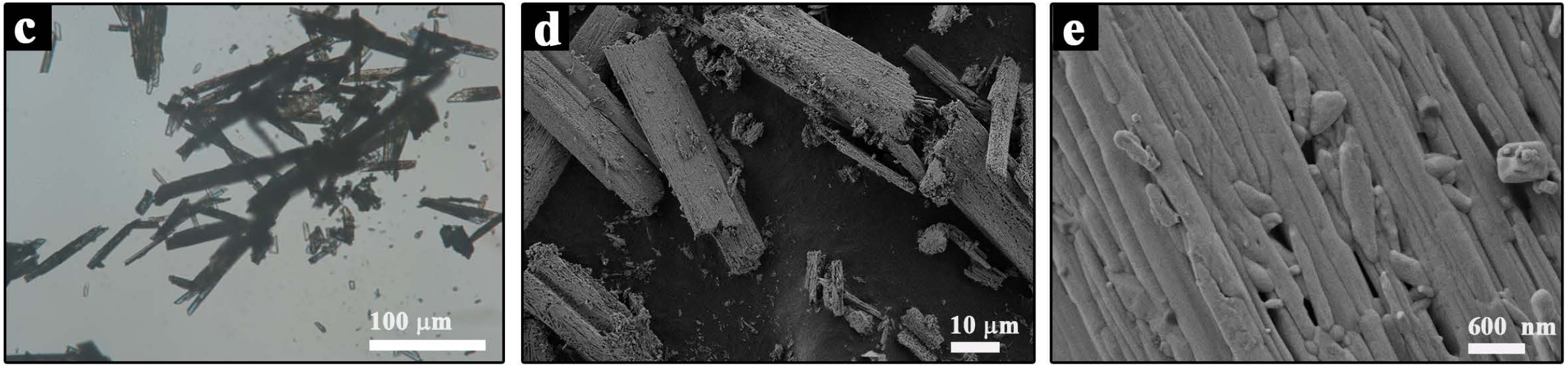
Structure characterization





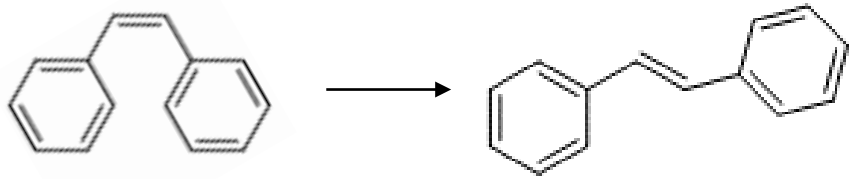
- X-ray Patterns of fine powder matched well with patterns simulated by single crystal structure
- Single crystal structure analysis indicate the formula to be $PbI_3(BZDA)_{0.5}\ (DMF)_2$
- 1D PbI_6 chains with facet-sharing connected by BZDAI diammonium

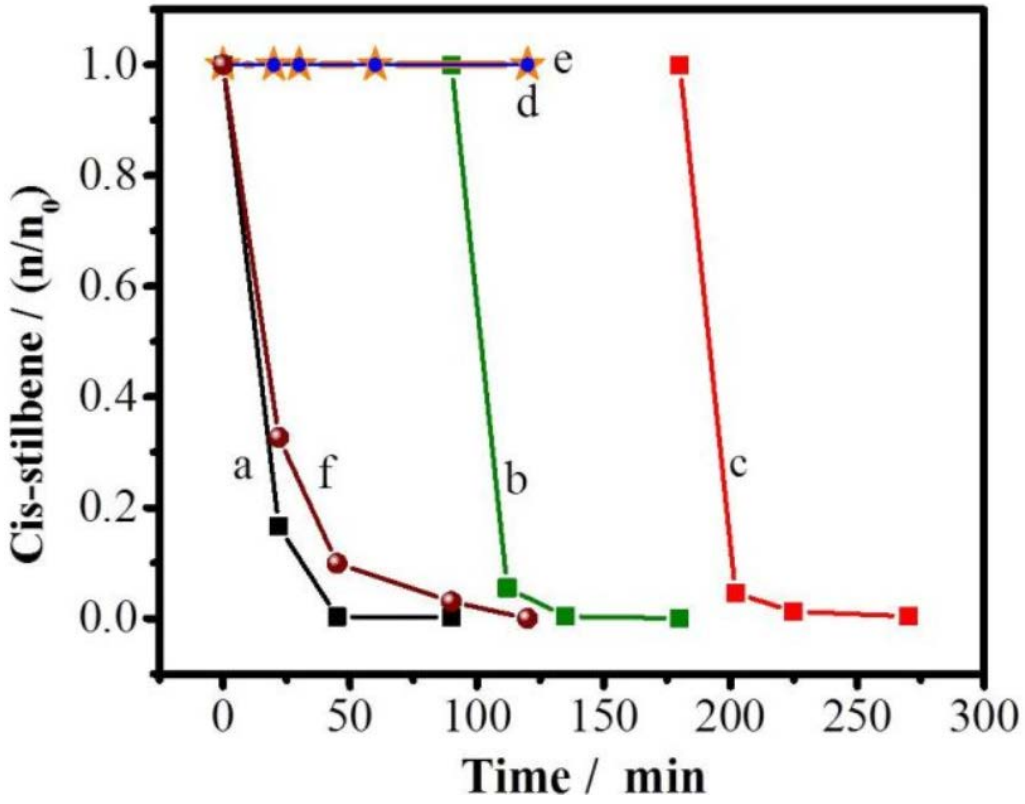
Morphology Characterization

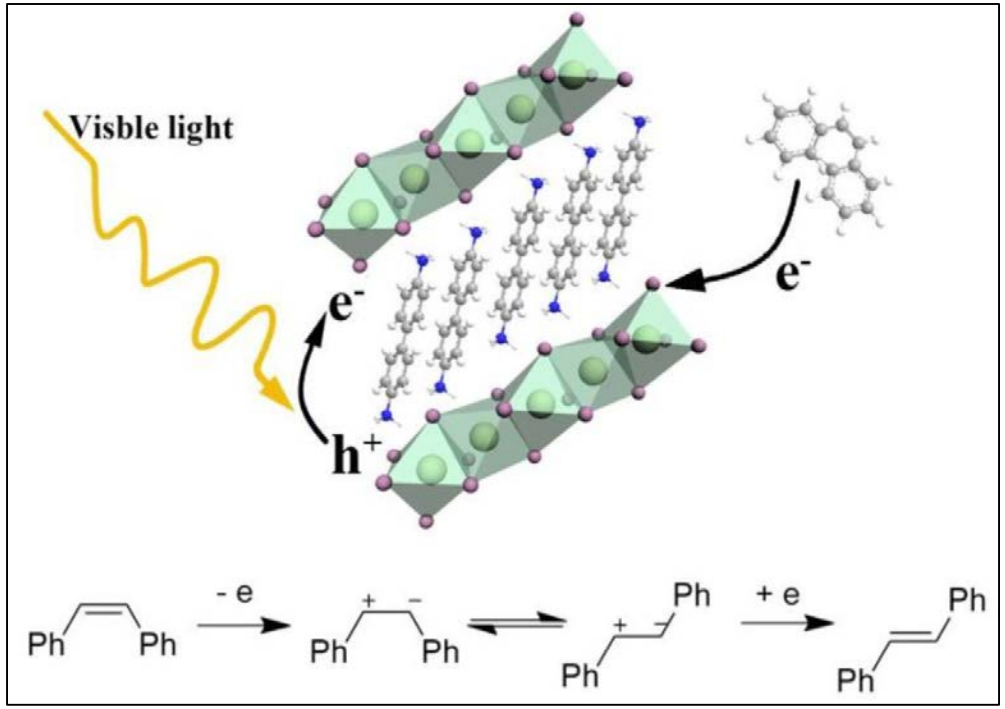


- High aspect ratio with length 100um and width 10um
- Consisted of the aggregation of small rods with diameter ~200nm, further confirmed the 1D structure

Isomerization reaction







- Phased transition complete 1hr with BZDAPbI as the catalyst
- No isomerization process occurs with the absence of light or catalyst

Conclusion

- 1D benzidinium perovskite fine powder was synthesized successfully
- The crystal structure, morphology and optical properties were well studied
- Benzidunium perovskite can act as the photocatalyst for the photoinduced cis-to-trans isomerization application and exhibited a relatively good stability