Photofunctional Materials Based on Organic Molecules

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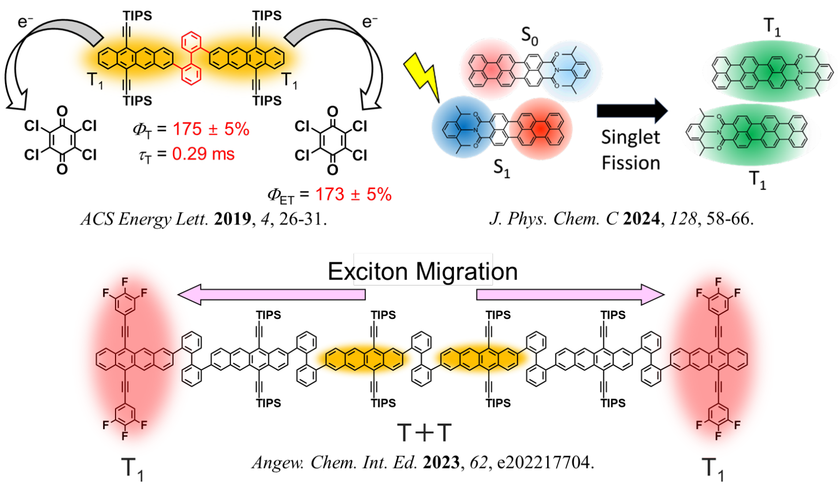


Fig. 1 Examples of SF materials.

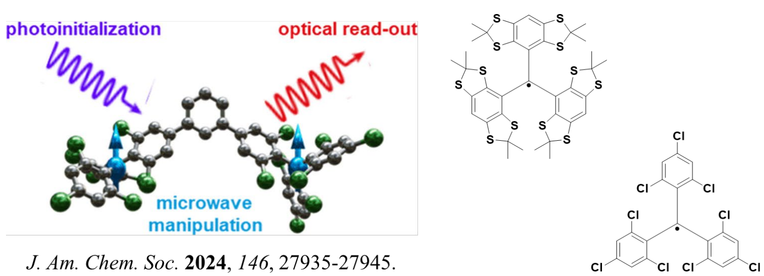


Fig. 2 Examples of stable organic radicals for quantum materials.

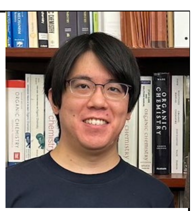
Content:

1, Materials for Improving Conversion Efficiency of Organic Photovoltaics

Singlet fission (SF), a photophysical process that can produce two triplet excitons from one photon absorption, has been actively studied in recent years because it can improve the conversion efficiency of organic photovoltaics. However, there is still no example of quantitative utilization of excitons via SF to develop organic photovoltaics with high conversion efficiency. In order to overcome the above situation, in this study, we will create materials in which charge-separated states can be generated quantitatively via SF and excitons can be freely controlled within molecular assemblies (Fig. 1).

2, Quantum Materials Based on Organic Molecules

Quantum material is a general term for materials that utilize quantum states such as quantum entangled states. By precisely controlling the excited and spin states of organic molecular materials, applications such as quantum computing and quantum sensing can be realized. In this study, we will work on the creation of materials in which quantum states (especially spin states in excited states) can be precisely controlled by combining stable organic radical materials and SF materials (Fig. 2).



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