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Platinum-based metallopolymers for 3D printing applications

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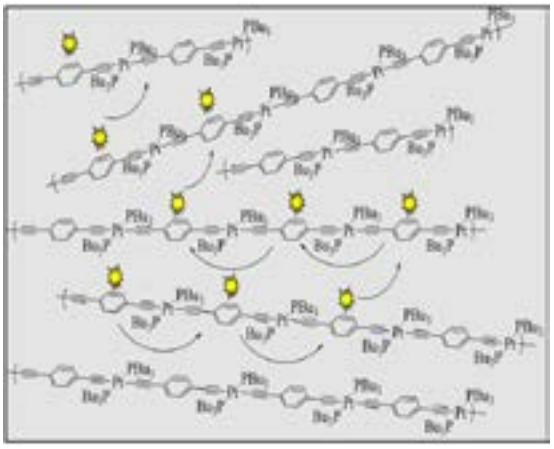
To promote the performance for 3D printing and photoelectric devices, we have to study what conducts triplet exciton transport through the organic electronics. The ability of exciton transport can be quantified by the exciton diffusion coefficient (D) and length of diffusion (Ld), we thus estimate triplet exciton diffusion parameters for a series of platinum-based metallopolymers, pPtPh, pPtPh(CH_2) and pPtBP, with a concentration-based exciton quenching method. With regard to the mechanism of transport, temperature dependent dynamics of the triplet exciton is investigated to distinguish the role of interchain transport in the conjugated system compared to interchain hopping transport in the conjugation interrupted systems. We demonstrate that an enhanced triplet diffusion coefficient in the fully conjugated polymer compared to the conjugation-interrupted structure is found as a result of lower activation energy (E_a). By contrast, the electronic coupling in conjugation-interrupted system is less due to the lower electronic coupling constant (H_{AB}).



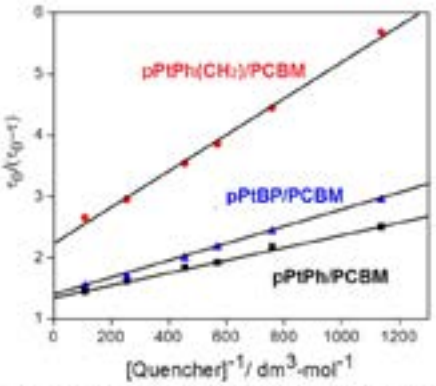


Figure 1. Hindered-Access plots for pPtPh/PCBM (squares), pPtPh(CH_2)/PCBM (circles) and pPtBP/PCBM (triangles) blended films. Error bars have been omitted for clarity.

Biography

Sam H Y Hsu has his research interests involved in the material design, synthesis, processing, imaging, spectroscopy and solar energy application, aiming to explore fundamental properties and interactions of hybrid perovskite semiconductors and functional metallopolymer materials for developing efficient solar energy conversion processes. He has keen interests in photoinduced charge transfer processes, interfacial electron transfer, electrochemical hydrogen generation, and photoredox reactions for photovoltaics and solar fuel production. The investigations between material phenomena rely heavily on concepts and techniques of material and physical engineering, consisting of photophysics, electrochemistry, photoelectrochemistry, scanning photoelectrochemical microscopy imaging, ultrafast transient absorption and time-resolved photoluminescence spectra.

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