Fundamental and Applications of Materials via Control of Ground and Excited State Properties

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Abstract

I would like to present the exploitation of molecular design and spectroscopic technique, together with the theoretical approach, to probe several cutting-edge issues regarding the structure/excited-state properties relationship. I will focus on the morphology dependent and the associated exciton coupling will be presented using emerging compounds as prototypes. Strong near IR emission can be achieved via molecular self-assembly to break down the energy gap law. Record high NIR OLEDs have been fabricated accordingly. Also, I would like to present a series of phenazine derivatives that undergo excited-state structural transformation. Depending on the substituents and external stimulus, the ratiometric emission has been successfully applied in bio-sensing and imaging. Finally, I will talk about recent progress on the excited-state proton transfer, for which the reaction dynamics and thermodynamics can be fine-tuned via the hydrogen bonding (H-bond) strength, including those non-classic sulfur H-bond and their potential application in sensing bio-waters. A summary of my current focus will be presented at the end of the talk.

Keywords - exciton coupling, structural transformation, excited-state intramolecular molecular proton transfer.

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