Phosphorescent Properties of the $ZnPc(COOH)_4$/Dx/ZnO Composite

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Abstract. Room-temperature phosphorescent materials are needed because they offer unique properties and potential applications in various fields due to their capacity to absorb, store and emit light. In this study we summarized the progress in long-lived room-temperature phosphorescent system synthesized by self-assembly of $ZnPc(COOH)_4$ derivative and ZnO/Dx NPs in DMSO/H_2O through a combination of electrostatic interactions and hydrogen bonding. Conjugation of the peripheral carboxy (–COO^-) substituted ZnPc to ZnO/Dx NPs in DMSO/H_2O broaden absorption bands, boost its triplet quantum yields and increase their triplet lifetimes from ~8.9 μs to ~10.2 μs. The triplet state parameters discussed in this study, together with the ground state absorption properties suggest that $ZnPc(COOH)_4$/Dx/ZnO composite may be tested as photosensitizers in photodynamic therapy.

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