

## **In situ One-Step Synthesis of Graphene Quantum Dots-Metal Free and Zinc Phthalocyanines Conjugates: Investigation of Photophysical Properties**

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**Abstract :** Nanoconjugates of graphene quantum dots (GQDs) and 4-(tetrakis-5-(trifluoromethyl)-2-mercaptopyridinephthalocyanine ( $H_2Pc(OPyF_3)_4$ ) or 4-(tetrakis-5-(trifluoromethyl)-2-mercaptopyridinephthalocyaninato) zinc (II) ( $ZnPc(OPyF_3)_4$ ) were synthesized via a novel in situ one-step route. The bottom-up approach for the prepared conjugates could ensure the intercalation of the phthalocyanines (Pcs) directly onto the edges or surface of the GQDs and or non-covalent coordination using the  $\pi$ -electron systems of both materials. The as-synthesized GQDs and their Pcs conjugates were characterized using different spectroscopic techniques and their photophysical properties evaluated. The singlet oxygen quantum yields of the Pcs in the presence of GQDs were enhanced due to Förster resonance energy transfer (FRET) occurrence within the conjugated hybrids. Hence, these nanoconjugates are potential materials for photodynamic therapy (PDT) and photocatalysis applications.

**Keywords :** graphene quantum dots, metal free fluorinated phthalocyanine, zinc fluorinated phthalocyanine, photophysical properties

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