INTERACTION OF FLUORESCENT CHROMOPHORES AND NANOSTRUCTURES WITH GRAPHENE SHEETS

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Graphene has emerged as a key platform for the adsorption of molecules and nanostructures due to its exceptional surface properties and versatility, with applications in flexible optoelectronics, energy storage, light harvesting, and biosensing [1–4]. Despite extensive research in these areas, the fundamental nature of the interactions between graphene and the adsorbed species remains insufficiently explored. In this work, we offer a contribution to this topic by investigating how graphene interacts with various fluorophores, focusing on their physicochemical properties upon adsorption. To probe these interactions, we selected highly emissive molecules and nanostructures, including two fluorescein derivatives and several types of carbon dots (CDs). CDs are intrinsically fluorescent, core–shell-like nanoparticles with dimensions below 10 nm and they are composed by a carbonaceous core and surface functional groups [5]. Our study wants to provide insights into the interaction mechanisms between these species and graphene, which can occur either through the fluorophores' functional groups or their aromatic moieties. Our findings indicate that graphene primarily interacts with the aromatic moieties of the fluorophores, while their functional groups remain largely unbound. This insight contributes to a deeper understanding of how graphene mediates surface interactions at the nanoscale.

References

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