Supramolecular Functionalization of Graphene with a Nonplanar Recognition Motif

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Graphene is a hot topic in today's science and technology due to its outstanding mechanical and electronic properties [1]. In particular, this material offers promising opportunities for electronic devices and for the fabrication of innovative optoelectronic devices. However, to overcome the drawbacks of low solubility and re-aggregation found in solution processes involving graphene layers, covalent or supramolecular chemical derivatization is a requirement prior to their transfer to solid substrates [2].
In this communication, we will present our results on the synthesis of new graphene-based nanohybrids involving different electron-donor moieties, namely exTTF-type electron donors, connected through supramolecular chemical linkages [3]. Furthermore, fullerene fragments such as hemifullerene ($C_{30}H_{12}$) resembling curved nanodots of graphene have been complexed with curved TTF-type electron donors and electron transfer processes occur upon light irradiation leading to the observation of a charge separated state involving a fullerene fragment [4]. Theoretical calculations underpin the experimental findings and a detailed characterization of the new chemical nanostructures will be thoroughly discussed.

References

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Figure. Supramolecular interaction between hemifullerene and Trux-TTF species