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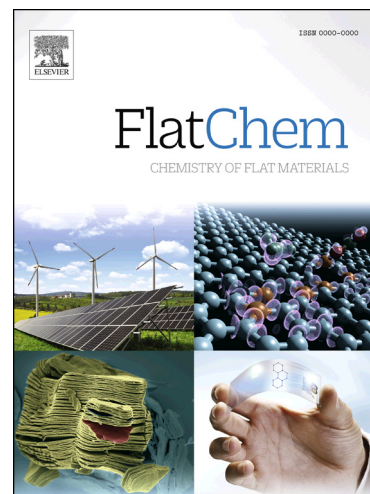
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# Preparation of uncurled and planar multilayered graphene using polythiophene derivatives via liquid-phase exfoliation of graphite

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**Short Title: Preparation of graphene using polythiophene**

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## ABSTRACT

We have investigated the effects of the preparation conditions of polythiophene/graphene complexes on their dispersion in organic solvents, and on the in-solution morphology of the multilayered graphene. Among four different regioregular polythiophene derivatives synthesized, poly(3-hexylthiophene) (P3HT) with a low molecular weight ( $M_n$  6000) was the most effective derivative for exfoliating graphite and for dispersing the multilayered graphene in toluene. Spectroscopic analysis revealed that P3HT interacted strongly with graphene to form a P3HT/graphene complex. We investigated the in situ morphology of multilayered graphene in organic solvents, using a flow particle image analyzer (FPIA) and revealed that the presence of polythiophenes produced larger P3HT/graphene complexes than that prepared in *N*-methylpyrrolidone (NMP). Microscopy analysis demonstrated that graphite flakes and

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