**Graphene dispersions in alkanes: toward fast drying conducting inks**

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**Abstract**

Conducting inks are becoming widely popular, however the vast majority of them are formulated in polar solvents having high boiling points. Therefore, ink drying acts as a bottle-neck in a roll to roll printing process. However, graphene dispersions in non-polar solvents are usually colloidaly unstable. Here, we developed a highly-conductive fast-drying graphene ink in nonpolar alkanes. For this purpose, graphite was exfoliated in isooctane in the presence of a block-polymer, poly(CEM11-b-$EHA_7$) containing pendant cholesterol groups. This cholesterol-based stabilizer forms non-covalent supramolecular interactions with the graphene conjugated system.[1] The electrochemical and structural properties of the graphene inks can be tailored by carefully tuning the surface coverage of graphene leaflets by the polymer. The sheet resistance (Rs) of the graphene films decreases when surface coverage of the graphene flakes decreases, with Rs reaching approximately 700 Ω (specific capacitance 7.9 µF.$cm^{-2}$) for a film thickness of 6 µm on non-treated glass at 23% surface coverage. By surface treating glass with an adhesion promoter (HMDS), Rs as low as 80 Ω can be reached. Furthermore, in comparison to water based inks, the alkane ink is shown to dry instantaneously. Thus, such ink formulations are expected to have a high potential in the development of roll-to-roll printed electronics.

**References**

[1] Nguendia JZ, Zhong W, Fleury A, De Grandpré G, Soldera A, Sabat RG, Claverie JP. Chem Asian J. **5** (2014) 1356-64.

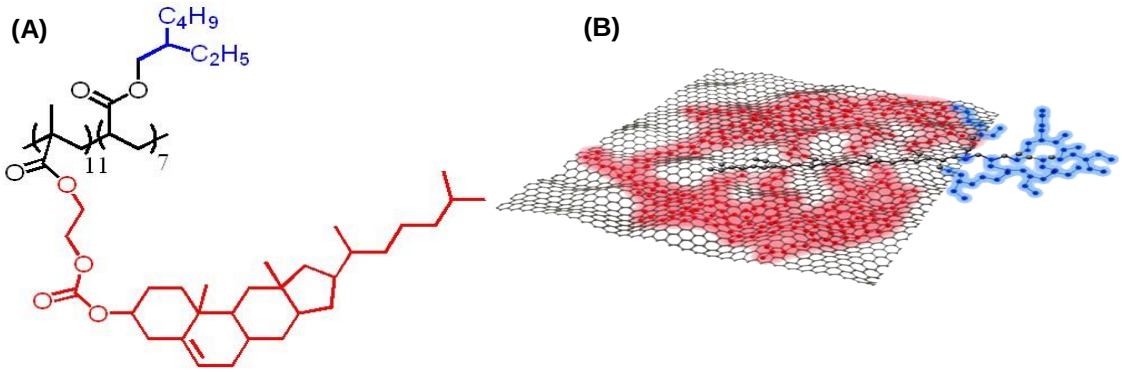


**Figure 1: (A) Chemical structure of poly(CEM11-b-EHA7), (B) Schematic illustration of the cholesterol containing polymer adsorbed on a graphene flake.**