

On the Solvation Behavior of Graphene Oxide in Ethylene Glycol/Water Mixtures

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Abstract

© 2018 Wiley-VCH Verlag GmbH & Co. KGaA, Weinheim. The self-association and solvation pattern of graphene oxide (GO) in water, ethylene glycol (EG), and their mixtures were analyzed by means of UV/Vis spectrophotometry. A careful analysis of the absorbance dependencies vs. the GO concentration shows that self-association of the GO sheets in EG occurs at higher concentration compared to that in water. It was established that depending on the mixed solvent composition, two different types of the GO solvates are formed. The results of quantum chemical calculations allow one to suggest that in the water-rich compositions, the GO oxygen-containing groups are in direct contact with water molecules while in the glycol-rich media the EG molecules fully substitute water in the GO's first solvation layer.

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Keywords

Ethylene glycol, Graphene oxide, Quantum chemical calculations, Solvation, UV/Vis spectrophotometry