

Dispersibility Determination of Stable g-C₃N₄ Colloidal Suspensions in Common Solvents

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The present study intends to investigate the dispersion behavior of graphitic – Carbon Nitride (g-C₃N₄) in a wide variety of solvents. In this context, twenty (20) different solvents were utilized, covering a broad range of physicochemical characteristics (e.g. polarity, boiling point etc.). The synthesized g-C₃N₄ was extensively characterized in powder form by Attenuated Total Reflectance (ATR-IR), Ultraviolet-visible (UV-vis) and Raman spectroscopy, as well as X-ray diffraction (XRD) in order to confirm its layered structure. Next, stable dispersions were prepared through a tip-assisted ultrasonication process, followed by centrifugation and careful isolation of the supernatant from the sediment. The final concentration of the dispersed and exfoliated g-C₃N₄ flakes in each solvent was determined according to the Beer-Lambert's law. It should be highlighted, that this is the first time in the literature that stable g-C₃N₄ dispersions were prepared in various solvents by tip-ultrasonication instead of the conventional bath-assisted one, while the Hansen Solubility Parameters (HSP) of the material were calculated. [1,2] The acquired knowledge will be exploited to prepare and characterize waterborne polyurethane (PU)/C₃N₄ nanocomposites, expecting that the formation of multiple hydrogen bonds within the PU will endow the nanocomposites with improved mechanical and self-healing properties.



Figure 1: g-C₃N₄ dispersions in Acetone, Acetic Acid, Butanol, Ethylene Glycol.

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