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Effect of Graphene on the Crystallisation of Glycine

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Nucleation, the initial stage of molecular self-assembly in crystallisation, is still not fully understood. Thus, producing crystals of the desired form (polymorph) is a current challenge faced by the industry and academia[1]. Templated crystallisation, where nucleation can be initiated at specific sites of the substrate or by impurities, is a promising approach to achieve preferential nucleation. Graphene has never been utilized to template the crystallistion of organic molecules so far, despite its attractive properties[2], which include tunability of its surface via covalent functionalisation and ease of solution processability.

This work investigates the use of graphene on the crystallisation of the simplest amino acid, glycine. The polymorphism of glycine is investigated by Raman spectroscopy as this technique is able to detect even a small trace of different polymorphs, well below the sensitivity of X-Ray Diffraction (XRD). Our results show that graphene does affect the polymorphic outcome of glycine, but this strongly depends on the surface properties of graphene, in agreement with the computational studies[3].

References

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