

Versatile synthesis of bulk and graphdiyne film at liquid-liquid interface

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Abstract

Hydrogen substituted graphdiyne (HsGDY, **3**) has been synthesised both in bulk and at a liquid-liquid interface (figure 1). This work employs a modified Glaser-Hay coupling reaction of triethynylbenzene (TEB, **2**) monomer in the presence of propylamine as the base and copper iodide as the catalyst with atmospheric O₂ as oxidant. For the two-phase reaction, slow diffusion of atmospheric O₂ in to TEB and base (organic phase) and catalyst (water phase) is shown to assemble thin film of targeted material at the template surface offered by the immiscible liquids. Raman scattering of the products (figure 2) together with TEB and 1,4-diphenylbuta-1,3-diyne (DPB, **1**) for reference as well as other spectroscopic and microscopic characterizations confirm clean preparation of targeted material at ambient temperature using this straightforward technique [1, 2].

References

1. Hu, G., J. He, and Y. Li. ACS Catalysis, 12 (2022) 6712-6721.
2. Man, Z., Li, P., Liu, S., Zhang, Y., Zhu, X., Ye, S., Lu, W., Chen, W., Wu, G., and Bao, N. ACS Applied Materials & Interfaces, 15 (2023) 26910-26917.

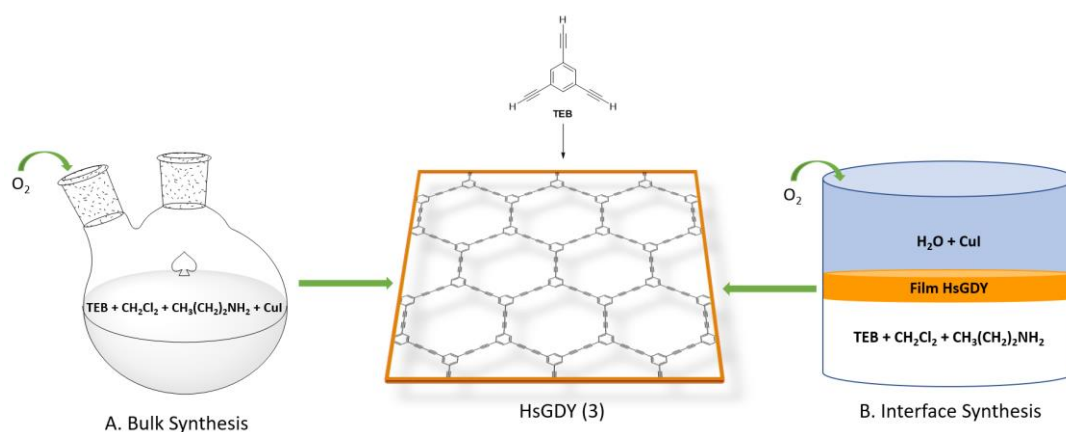


Figure 1: HsGDY synthesis using TEB monomer.

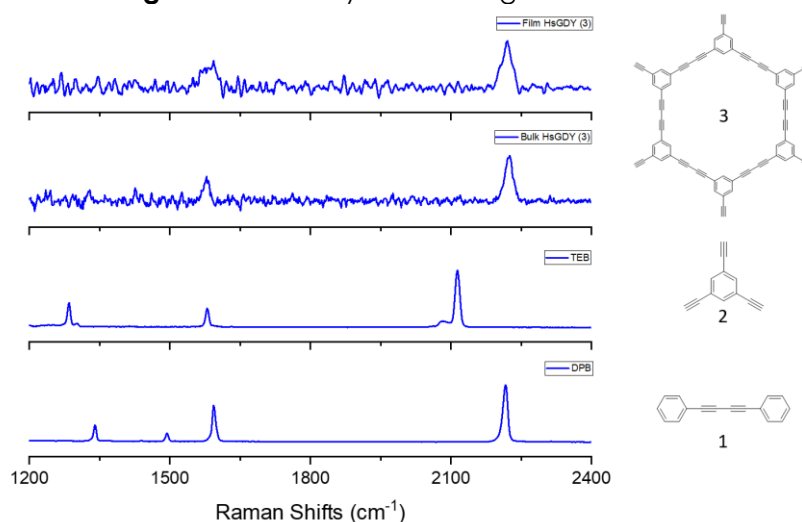


Figure 2: Raman spectra of bulk and film HsGDY (**3**), TEB (**2**) and DPB (**1**) for reference.