

Orientation of 4-n-octyl-4'-cynobiphenyl molecules on graphene oxide surface

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Graphene oxide (GO) flakes [1] were introduced in anisotropic medium of 4-octyl-4'-cynobiphenyl (8CB) to investigate the long range molecular interaction of 8CB molecules with that of the GO surface. It is observed that 8CB molecules always vertically adsorb on the surface of GO flakes but observed polarized optical micrographs reveal the random orientation of GO flakes with bulk 8CB molecules. As the concentration of GO in 8CB matrix is varied, the molecular orientation successively progressed towards the homeotropic alignment in bulk. This molecular orientation is attributed to electron-phonon interaction taking place between the electrons present on CN functional group of 4-octyl-4'-cynobiphenyl with that of the phonons of GO. The investigated results are supported by the Raman spectroscopy, Fourier transformed infrared spectroscopy and polarized optical microscopy.

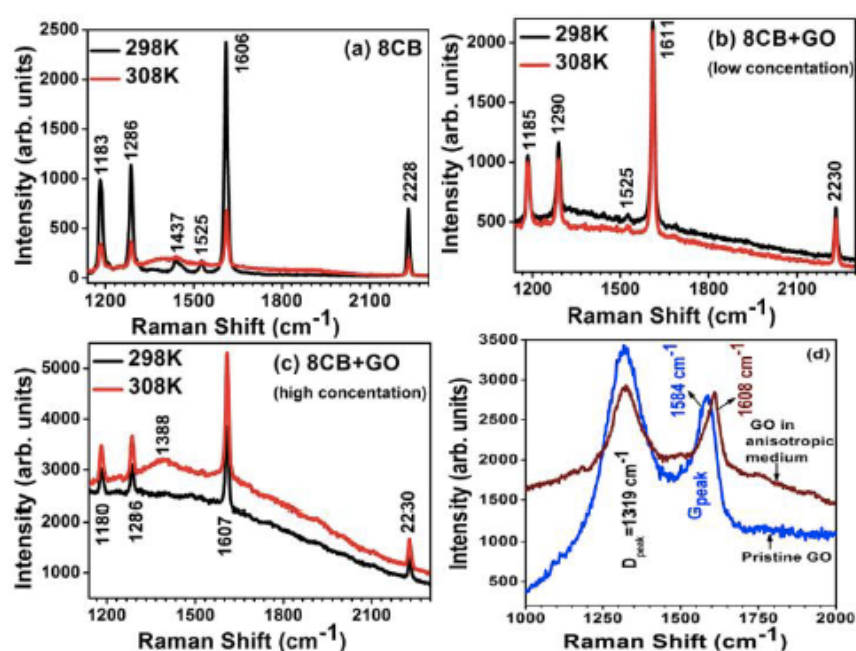


Figure 1: Experimental Raman spectra of (a) 4-n-octyl-4'-cynobiphenyl (8CB), (b) 8CB+graphene oxide (GO) hybrid material for low concentration of GO (wt% ≤ 0.1), (c) 8CB+ GO hybrid material for high concentration of GO (wt% > 0.1), whereas (d) shows the Raman spectra of GO in pristine form and in the anisotropic (8CB) medium.

References

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