The true liquid crystal phases of polymeric carbon nitride

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2D materials have been interested due to its broad application in various fields such as electronics, catalysis, and biosensing, and etc. One of most important issues for using 2D materials is their dispersion in common solvents to enable solution process, which is critical from both fundamental and practical points of view. Especially, liquid crystalline (LC) phase of 2D materials could translate remarkable properties of individual nanomaterials into macroscopic structure.

Graphitic carbon (IV) nitride (g-C_3N_4) as one of 2D materials is one of binary phase compounds of carbon and nitrogen in close analogy to graphite/graphene system of carbon. g-CN based materials have advanced considerably over recent years in which efforts were given especially to molecular structure-optoelectronic property-catalytic function relations. These studies, however, focused their efforts on powder materials that suffer from poor dispersibility, difficult recovery, and low surface accessibility. In this work, we controlled g-CN, MTCA-550, with high-aspect ratio and expanded interlayer spacing could induce its true LC phase in concentrated sulfuric acid.