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Editorial

Triazine based porous organic polymers

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ABSTRACT: Porous organic polymers (POPs) are an important class of organic materials that can be used for various purposes like hydrogen storage, lithium batteries, and CO_2 capture from the environment. Triazine itself has a vast array of use as it contains nitrogen at its three edges which can be efficiently used to synthesize nano architectonic porous organic polymers.

KEYWORDS: porous organic polymers; hydrogen storage; lithium batteries; nano architectonic; triazine

1. Introduction and observation

1,3,5-triazines represents a widely used lead structure with a multitude of interesting applications in numerous fields. As per Anupama *et al.*[1], triazine is a well-known compound in organic chemistry and has been used in a variety of applications as its 2,4,6-mono-, di- or trisubstituted derivatives bearing different substituents. As per Singh *et al.*[2], triazine is a prototypal molecule that has together with its derivatives wide commercial use, for example, in resins, dyes, herbicides, or as sulfide removal agents.

Triazine-based covalent organic polymers (COPs) constructed from triazine or nitrile-containing precursors via covalent bonding are becoming an important sub-class of porous organic framework materials for a range of applications, and support materials for a variety of liquid phase organic transformation reactions owing to their tunable porous structures with high surface area, high nitrogen contents, high stability in both organic and aqueous media, and relatively easy synthesis.

2,4-Dichloro-6-substituted s-triazine synthesized by Osman *et al.*[3] was reacted with 1,4-diamino butane followed by the addition of triethylamine as an HCl scavenger (Scheme 1). For comparative studies, the polymers were prepared using both conventional and microwave heating methods.

It is a unique porous structure of the nano-covalent triazine polymer (NCTP) containing aggregation-induced emission (AIE) group to achieve controlled release and drug tracking in tumor acidic microenvironment. NCTP was synthesized by the Friedel-Crafts alkylation and the McMurry coupling reaction. It not only had strong doxorubicin (DOX)-loading capacity due to its high specific surface area and large pore volume but also showed significant cumulative drug release as a result of the pH response of triazine polymers.

Aldalbahi *et al.*[4] synthesized and characterized two types of polymer-based s-triazine bishydrazino and bishydrazido derivatives and applied them as charring agents together with APP (ammonium polyphosphate) (as acid source) to build an IFR (intumescent flame-retardant) system that could develop the thermal degradation performance of Polypropylene.

Panić *et al.*[5] reported the synthesis and characterization of new two-dimensional (2D) benzene- and triazine-based azo-bridged porous organic polymers. The prepared polymers are all amorphous solids of good thermal stability, with the highest thermal stability observed for triazine-based. Rengaraj *et al.*[6] introduced a microporous covalent triazine polymer (CTP) network with a high surface area that was synthesized via the Friedel–Crafts reaction and employed as a potential transport system for drug delivery and controlled release. The CTP was transformed to the nanoscale region by intense ultrasonication followed by filtration to yield nanoscale CTP (NCTP). Khattab *et al.*[7] report the synthesis of a library of new s-triazine polyamides containing glycine and thioglycolic acid. The feasibility of the synthesized polymers as drug nano-delivery systems was investigated. The nanoparticles were loaded with celecoxib (CXB), an anti-inflammatory drug with a highly promising anti-cancer effect, resulting in high entrapment efficiency levels.

Conflict of interest

The authors declared no conflict of interest.

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