Title:	DESIGN AND DEVELOPMENT OF HIGHLY FLEXIBLE TRIAZINE BASED COVALENT ORGANIC FRAMEWORKS FOR SEPARATION AND REMOVAL OF ORGANIC DYES FROM WATER
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Keywords:	TRIAZINE COVALENT ORGANIC FRAMEWORKS ORGANIC DYES
Issue Date:	Mar-2020
Publisher:	IISERM
Abstract:	The covalent organic framework is an emerging field of porous materials, and the development of this is still in progress. In this direction, researchers have put their efforts, but the development of highly flexible COF is always a challenging and important task. In order to contribute, three highly flexible COFs have been synthesized using the solvothermal method and characterized by numerous analytical methods. Since the formation of highly flexible COF is callous, we have studied the growth mechanism of all three COFs using FESEM and HRTEM. Among all three COFs, O-COF owns beautiful microtubular morphology with AA stacking and high thermal stability. The morphology of O-COF converters spherical to tubular morphology. Recent achievements in the field of COF towards covering most of the real-life applications and water purification is one of them, so all synthesized COFs have been used to remove organic pollutants from water solution for water treatment application. During dye removal application, it has been found that O-COF is predominant in terms of morphology and serves good adsorbent for RhB dye from the water waste. Along with this, dye separation was also shown based on electrostatic interaction and hydrogen bonding interactions. It was observed that O-COF is selectively adsorbed cationic dyes. A prototype was also done, in which O-COF was successfully employed as solid phase in liquid chromatography for the separation of cationic and anionic dyes. We observed that oxygen is playing crucial role for the adsorption process due to more electron negative nature compared to carbon. To understand dye adsorption process, pseudo first order, pseudo second order, and interparticle diffusion model have been used. The adsorption isotherm was fitted into Langmuir model. Moreover, all the synthesized COFs were characterized using Fourier transform infrared spectroscopy, solid-state ultraviolet–visible spectroscopy, thermogravimetric analysis, and X-ray diffraction, scanning electron microscopy. Furthermore, the stability of O-COF in the presence of dyes was investigated by powder X-ray diffraction and field emission scanning electron microscopy with good retention of crystallinity and morphology.
URI:	http://hdl.handle.net/123456789/1382
Appears in Collections:	MS-15