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Title:	A Dual-Function Highly Crystalline Covalent Organic Framework for HCl Sensing and Visible-Light Heterogeneous Photocatalysis
Authors:	Nailwal, Yogendra (/jspui/browse?type=author&value=Nailwal%2C+Yogendra) Wonanke, A. D. Dinga (/jspui/browse?type=author&value=Wonanke%2C+A.+D.+Dinga) Addicoat, Matthew A. (/jspui/browse?type=author&value=Addicoat%2C+Matthew+A.) Santanu Kumar Pal (/jspui/browse?type=author&value=Santanu+Kumar+Pal)
Keywords:	Dual-Function Crystalline Covalent Photocatalysis
Issue Date:	2021
Publisher:	ACS Publications
Citation:	Macromolecules, 54(13), 6595–6604.
Abstract:	Covalent organic frameworks (COFs) offer great potential for various advanced applications such as photocatalysis, sensing, and so on because of their fully conjugated, porous, and chemically stable unique structural architecture. In this work, we have designed and developed a truxene-based ultrastable COF (Tx-COF-2) by Schiff-base condensation between 1,3,5-tris(4-aminophenyl)benzene (TAPB) and 5,5',10,10',15,15'-hexamethyl-10,15-dihydro-5H-diindeno(1,2-a:1',2'-c')fluorene-2,7,12-tricarbaldehyde (Tx-CHO) for the first time. The resulting COF possesses excellent crystallinity, permanent porosity, and high Brunauer–Emmett–Teller (BET) surface areas (up to 1137 m ² g ^{−1}). The COF was found to be a heterogeneous, recyclable photocatalyst for efficient conversion of arylboronic acids to phenols under visible-light irradiation, an environmentally friendly alternative approach to conventional metal-based photocatalysis. Besides, Tx-COF-2 provides an immediate naked-eye color change (<1 s) and fluorescence “turn-on” phenomena upon exposure to HCl. The response is highly sensitive, with an ultralow detection limit of up to 4.5 nmol L ^{−1} .
Description:	Only IISER Mohali authors are available in the record.
URI:	https://doi.org/10.1021/acs.macromol.1c00574 (https://doi.org/10.1021/acs.macromol.1c00574) http://hdl.handle.net/123456789/5162 (http://hdl.handle.net/123456789/5162)
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