Supporting Information for

In-Situ Synthesis of 3D ZIF-8 on 2D MXene Nanosheets for Efficient Photocatalytic Degradation of Methylene Blue (MB)

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Material Characterization

To identify the crystal structure and phase composition of ZIF-8 and ZIF-8@Ti_3C_2 MXene nanosheets, powder X-ray diffraction (XRD; Bruker D8-Adance) was carried out. The morphology of the prepared material was examined using an emission scanning Electron Microscope (FESEM; Carl Zeiss- Sigma 300); which is also assisted with an Energy-Dispersive X-Ray spectrometer (EDS) to carry out elemental and mapping analysis. To investigate the loading of ZIF-8 on Ti_3C_2 nanosheets, Fourier Transform Infrared spectroscopy (FT-IR) analysis was carried out. The optical properties of reflectance, band gap analysis, and absorption were analyzed using Diffuse Reflectance Spectra (DRS; Double Beam Portable Jasco V750) with the help of a UV-Vis spectrophotometer. The photocatalytic performance of MB was investigated using a UV-Vis spectrophotometer within the wavelength range of 400-800 nm.

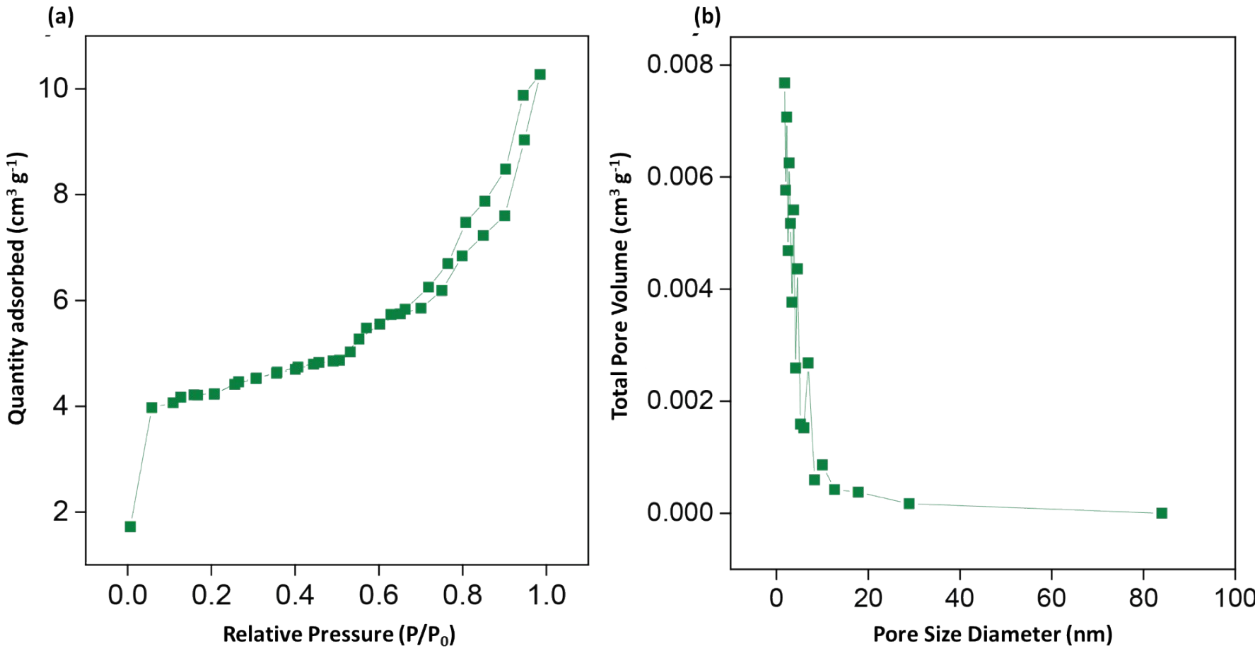

Figure S1. (a) Nitrogen adsorption/desorption isotherm for ZIF-8@MXene and (b) corresponding pore distribution.

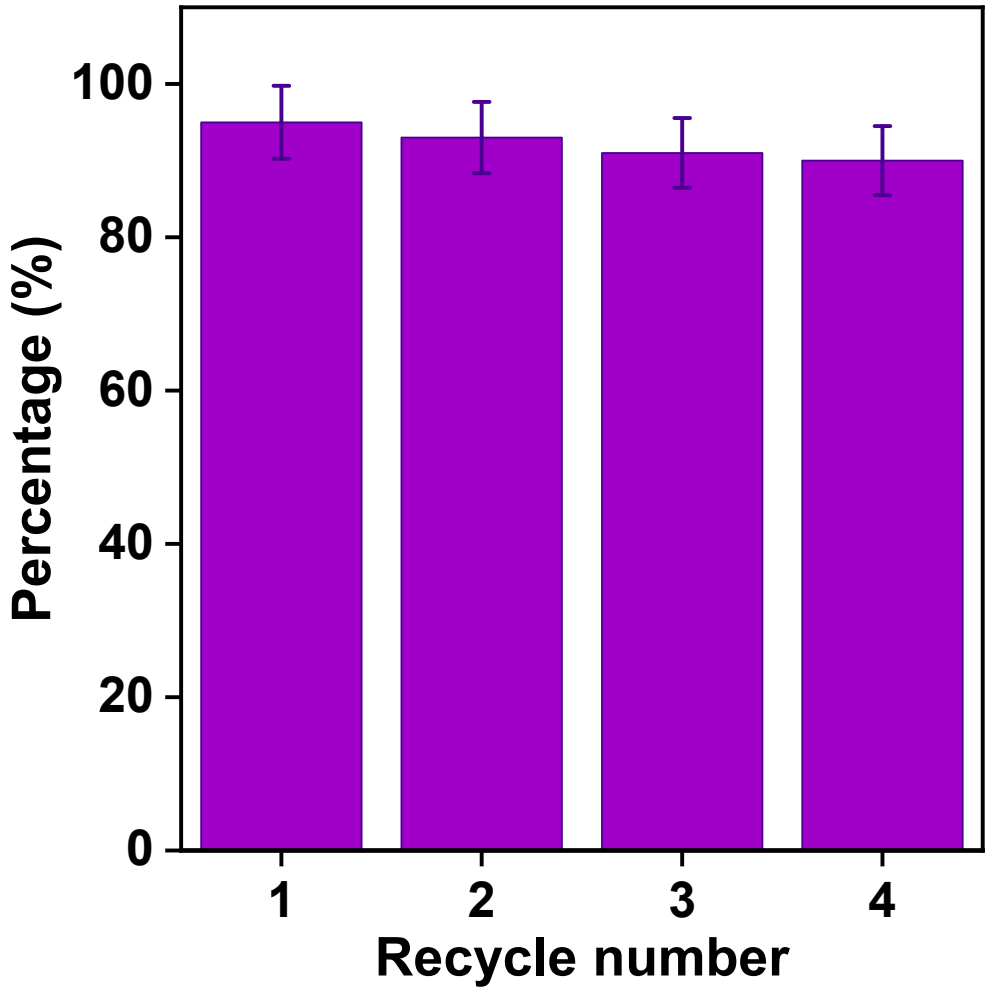

Figure S2. Effect of repeatability of ZIF-8@Ti_3C_2 MXene as a photocatalyst for degradation of MB.

Table S1. Summarized the photocatalytic performance of ZIF-8@Ti_3C_2 MXene nanosheets for methylene blue (MB) degradation compared to other reported materials.

Catalyst	Dye Degraded	Source of Light	Degradation efficiency	Reference
ZIF-8@Ti_3C_2 MXene	**MB**	**Visible light**	**95 %**	**This work**
AgNPs@ZIF-8	**MB**	**Visible light**	**84.18 %**	**S1**
(ZIF)-8-dot	**MB**	**Visible light**	**87 %**	**S2**
ZIF-8-AgNWs	**MB**	**Visible light**	**94 %**	**S3**
ZF-8@ZIF-67	**MB**	**Visible light**	**69 %**	**S4**
Ni-ZIF-8	**MB**	**UV-LED light**	**93.22 %**	**S5**
ZIF-8/LDO	**MB**	**UV light**	**58 %**	**S6**

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