# SUPPLEMENTAL INFORMATION

# Hybrid Nickel-free graphene polyporphririn photocatalyst: Time-saving material formulation and photo degradation studies

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MALDI-TOF analysis.





**Figure S1.** MALDI-TOF mass spectrum, acquired in positive and reflection mode, of **(a)** the porphyrin copolymer with a table for the structural assignments and **(b)** the porphyrin copolymer deposited on Ni Free/G surface.

#### Table S1.

Polymer	Nominal % Porphyrin molar content	Actual % Porphyrin molar content	Polymer yield (w/w)ª	Mw <sup>b</sup>	Mn <sup>b</sup>
Cyclic copolymer	50	39%	77%	10580	9300

Composition, yield and Molar Masses of synthesized polymers

a) Percent of polymeric material with respect to the total amount of starting monomers

b) Molar masses values calculated by using PMMA as GPC standards.

## **XPS Analysis.**



Figure S2. Ni2p region XPS spectrum of Ni-free/3DG Copolymer

Cyclic Voltammetry.



**Figure S3.** Cyclic voltammetry of ferrocene recorded at 25 mV s<sup>-1</sup> scan rate in 0.1 M TBAPF6 in dichloromethane solution by using SCE as reference electrode.



Figure S4. Cyclic voltammetry recorded at 25 mV s-1 scan rate in 0.1 M TBAPF6 in dichloromethane solution. Ferrocene was used as internal standard.



**Figure S5.** Cyclic voltammetry of monomer recorded at 25 mV s-1 scan rate in 0.1 M TBAPF6 in dichloromethane solution. Ferrocene was used as internal standard.



Figure S6. UV-Vis spectrum of porphyrin copolymer in dichloromethane



Figure S7. UV-Vis spectra of 2,4-D before and after the photocatalytic experiment.



**Figure S8.** Polymer structures assigned to the mass ions appearing in the MALDI-TOF spectra of PEG sample after 6 hours of photoexposure.



Figure S9. MALDI-TOF spectrum of PEG sample after 6 hours of photoexposure at lower mass range.



**Figure S9.** Degradation test of MB after addition of different concentrations of ABDA (0, 1, 10, 15 mg/L) under light irradiation.



**Figure S10.** Degradation test of MB after addition of tert-butyl alcohol (0, 1, 10, 15 mg/L) under light irradiation.



**Figure S11.** Degradation test of MB after addition of different concentrations of EDTA (0, 1, 10, 15 mg/L) under light irradiation.



**Figure S12.** Degradation test of MB after addition of different concentrations of NBT (0, 1, 10, 15 mg/L) under light irradiation.



**Figure S13.** (a) Solar simulator apparatus used to test the photocatalytic performances of the samples and (b) operating conditions used during the photocatalytic tests: irradiation removal in the range of 600-700 nm to suppress the MB absorption.