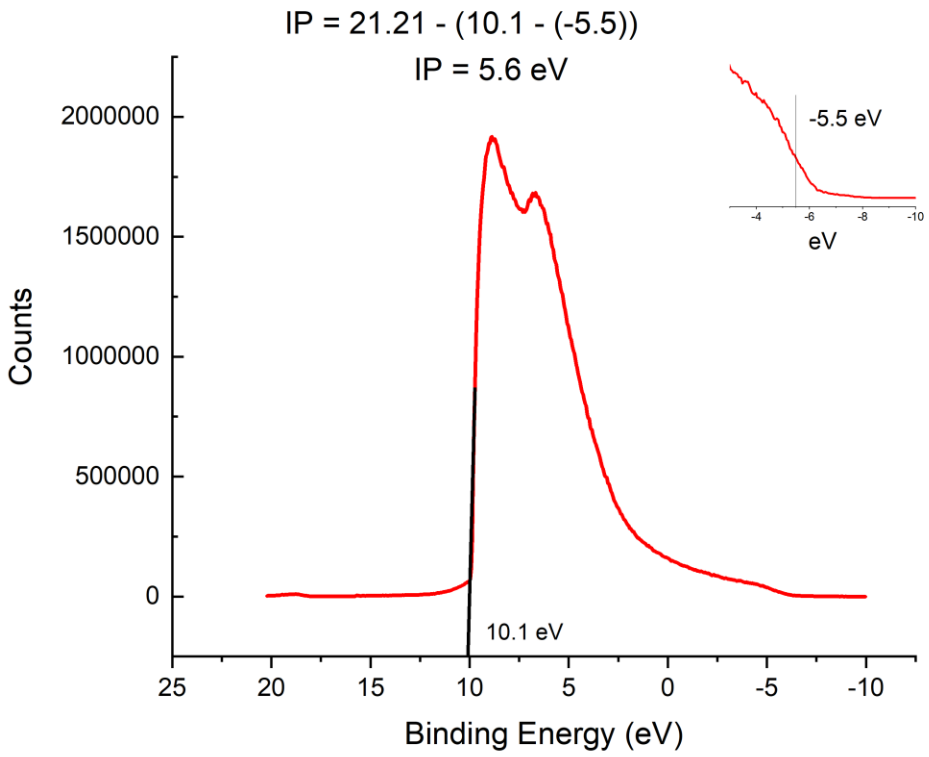
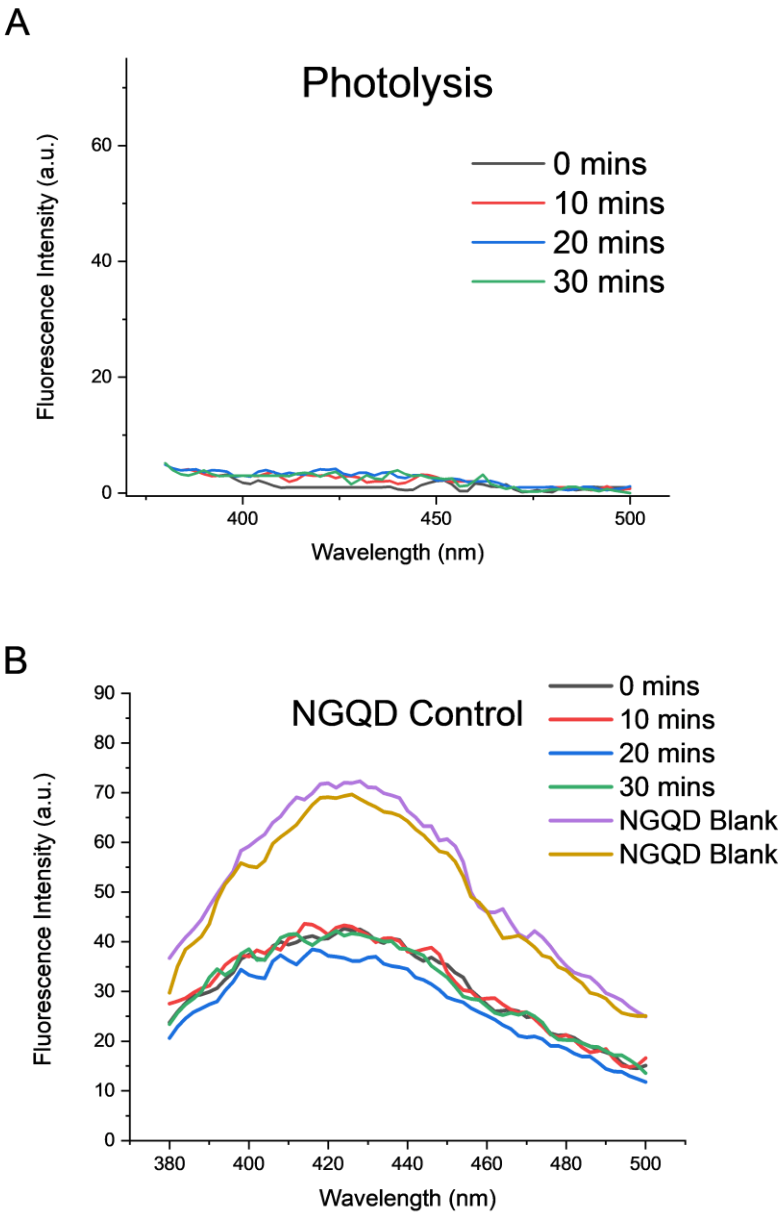
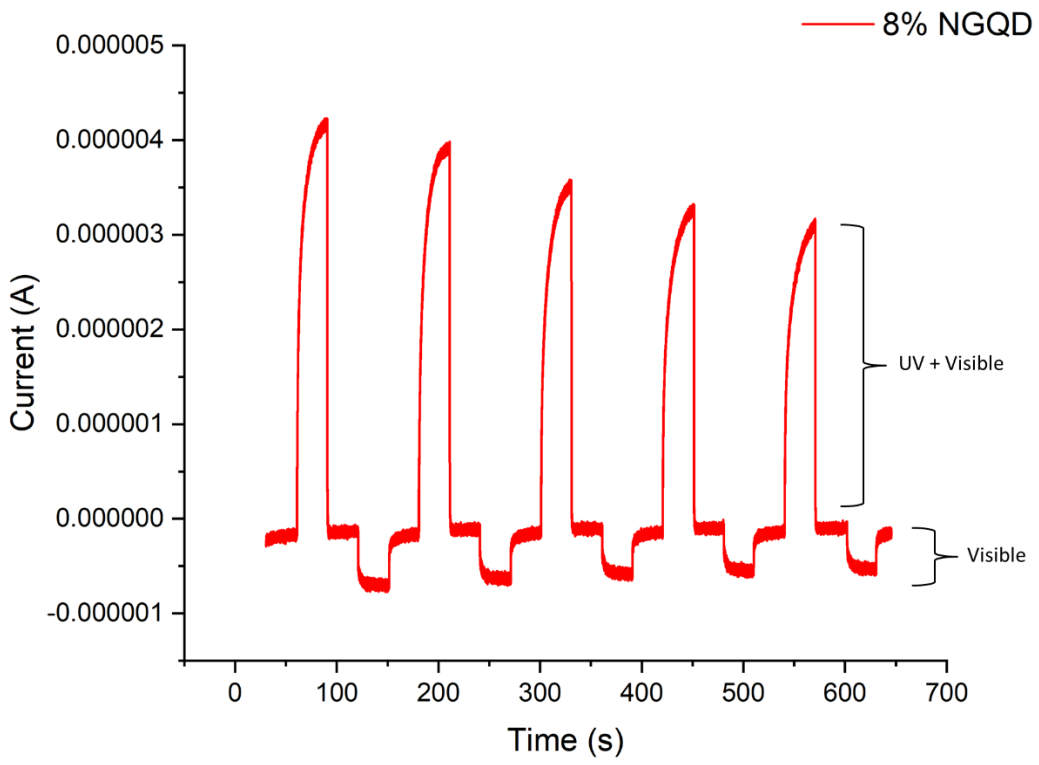
Supplemental



Supplemental S1: UPS of NGQDs under 10V bias. The ionization potential is calculated via the secondary electron cutoff (10.1 eV) and the valence band offset (-5.5 eV) utilizing the known energy of the He (I) light source.



Supplemental S2: Terephthalic acid radical capture fluorescence spectra of a) photolysis (no photocatalyst) and b) NGQD control (NGQD + Terephthalic acid) and NGQD blank (no Terephthalic acid present)



Supplemental S3: Photocurrent response of 8% NGQD thin film under alternating full spectrum / visible irradiation showing anodic to cathodic current switching

Supplemental S4: Phenol concentration determination via ^{1}H NMR

To obtain concentration:

Experimental fids were analyzed using MestReNova. Automatic baseline correction using Berstein Polynomial fit. Peak positions were shifted so H_2O residual peak centered at 4.8 ppm. Manual phase correction performed using maleic acid shoulder peaks as a guide. Absolute peak integrations were taken for maleic acid, downfield (H_B) and upfield (H_A & H_C) phenol peaks. Maleic Acid was used as an internal standard to calculate a conversion factor between the absolute integration of NMR peaks and the number of protons contributing. The conversion factor was calculated for each timepoint using the following equation.

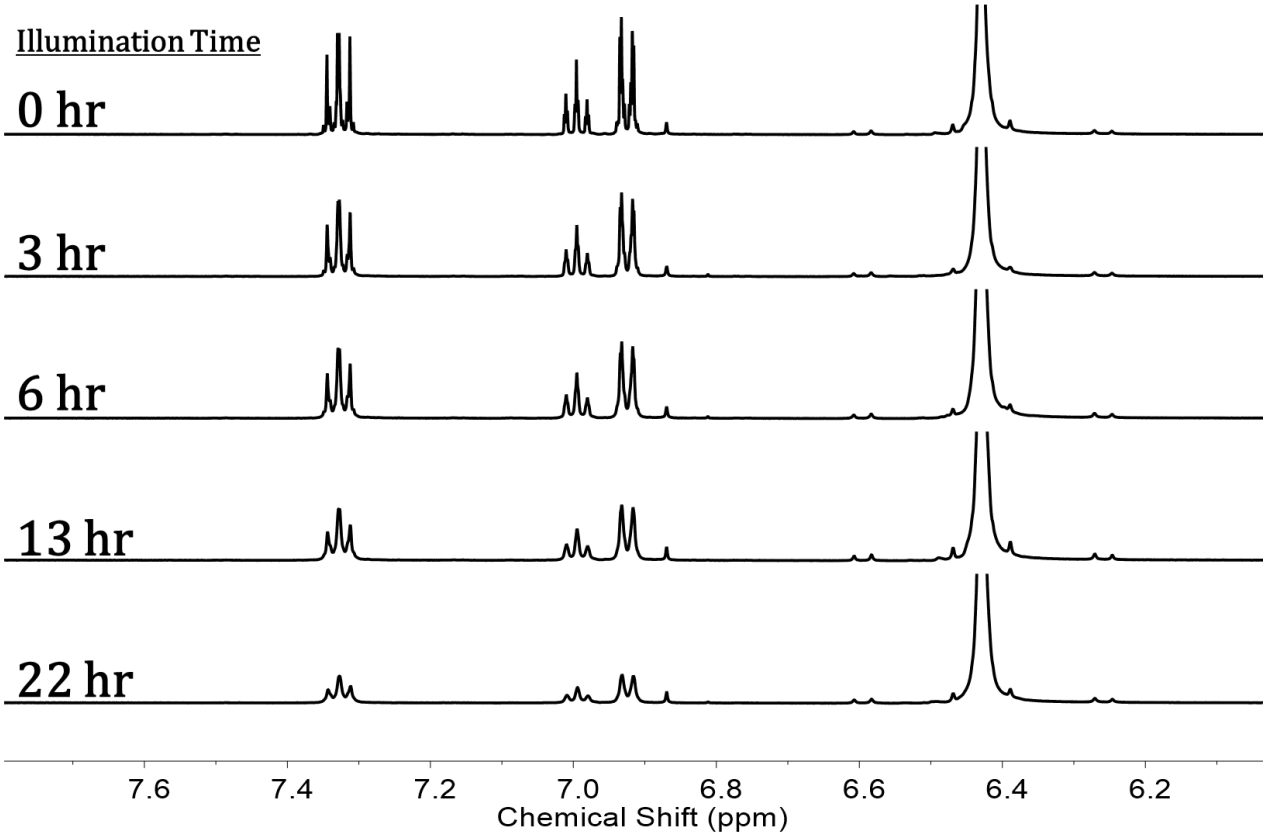
$$Internal\ Conversion\ Factor = \frac{Integration\ of\ Maleic\ Acid\ Peaks}{Concentration\ of\ Maleic\ Acid * n_{Maleic\ Acid\ protons}}$$

$n_{\text{Maleic Acid protons}}$ was taken as 2 for all samples and concentration was taken as 4.54 mg/mL per methods section. Phenol concentrations were calculated using the following formula:

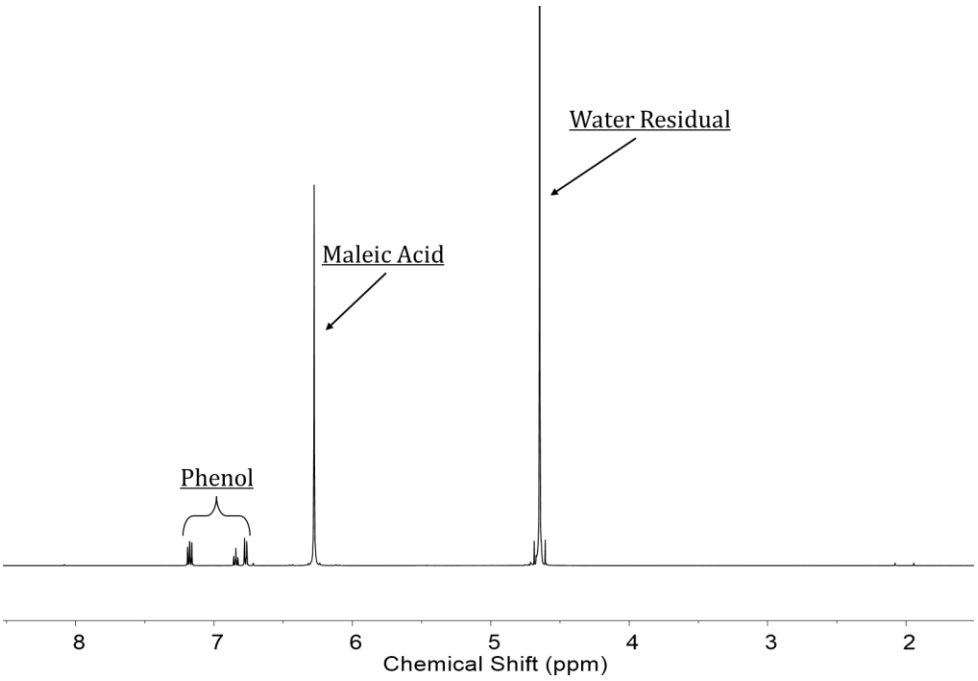
$$C_{Phenol} = \frac{Phenol\ Peak\ Integration}{Conversion\ Factor * n_{Phenol\ protons}}$$

$n_{\text{Phenol protons}}$ was taken to be 2 for downfield peaks and 3 for upfield peaks.

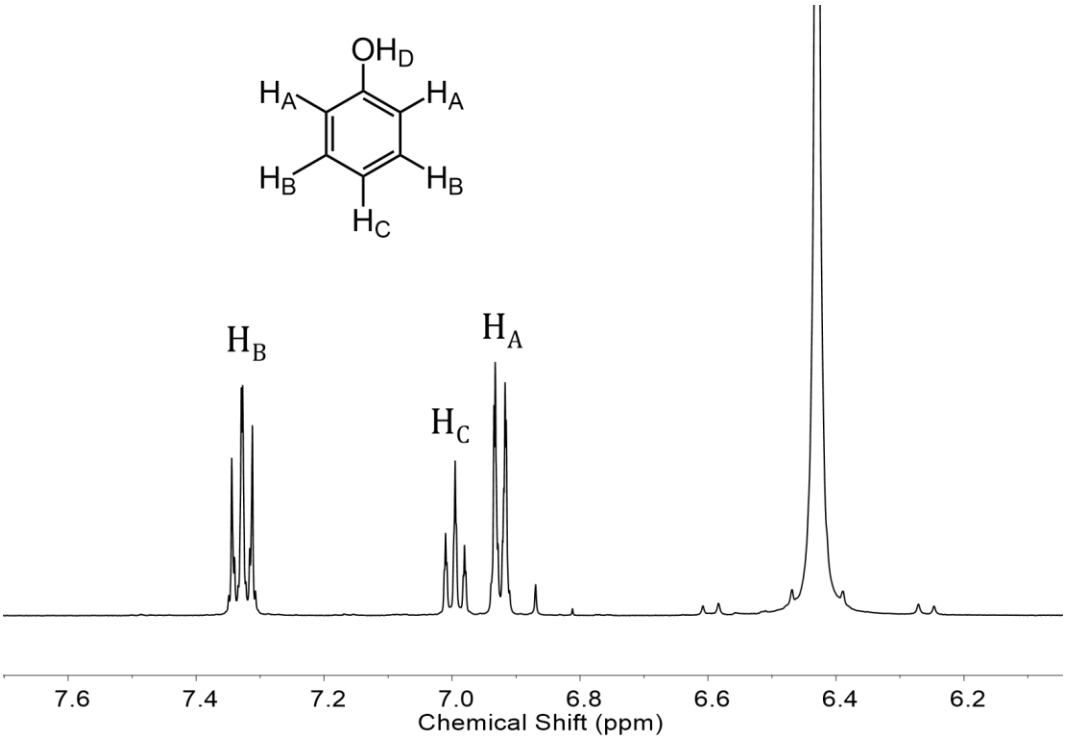
Time series of 4% NGQD full spectrum:

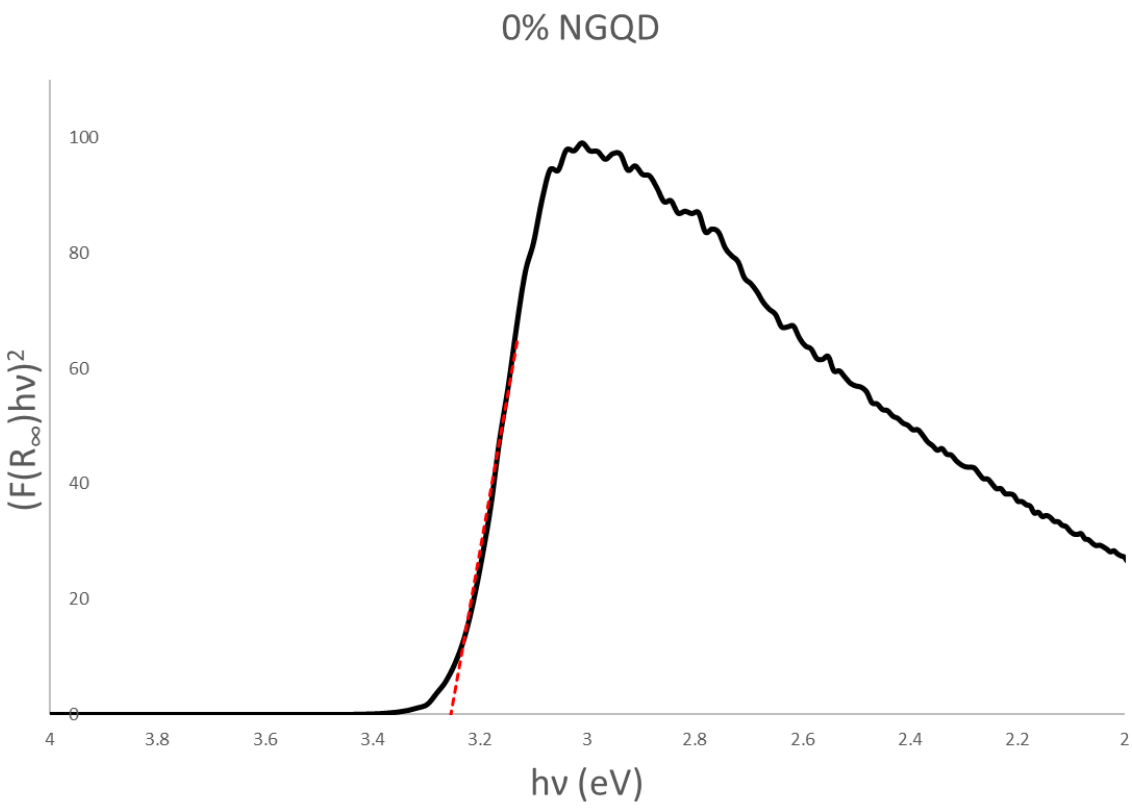


Full Spectrum at Time 0 for 4% NGQD:



Aromatic Region + Phenol Peak Assignments in 4% NGQD at Time 3 hr under full spectrum illumination:





Supplemental S5 Tauc plot for 0% NGQD