

Electronic Supplementary Information

Simultaneous layer exfoliation and defect activation in g-C₃N₄ nanosheets with air-water interfacial plasma: Spectroscopic defects probing with tailored optical properties

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Photocatalytic details

To explore the activity of the plasma treated samples as photocatalyst, we have chosen rhodamine B, which is a cationic dye, as the model pollutant. 200 mL of rhodamine B (RhB) solution with initial concentration 2.5 mgL^{-1} is taken in a beaker. 40 mg catalyst is loaded into the solution. The mixture is stirred in dark up to 45 minutes to ensure the adsorption of the dye solution on the catalyst surfaces. The photocatalytic reaction is performed under a white LED bulb with power rating of 18 watt. The light emission spectrum of the LED is obtained with Andor SR-303i-A spectrometer, as shown in Fig S3. It is evident from the OES spectrum that the bulb intensity lies in the visible region in the wavelength range of 420 nm to 700 nm. We have measured the intensity of the bulb with the help of an intensity meter (G & R Labs) at its perimeter and over the solution surface, i.e., 5 cm away from the bulb. The intensity of the white radiation is maximum at the perimeter with a value of 50 mWcm^{-2} and found to be reduced to a value of 36 mWcm^{-2} , at the surface of the solution. The solution is then irradiated with the LED bulb vertically, for a duration of 150 min under continuous stirring. After every 15 minutes, aliquot is collected and UV-visible absorption spectra is taken to monitor the degradation of RhB. The degradation of RhB in presence of CN, CN30, CN90, CN150 is plotted as a function of irradiation time.

Figure Files

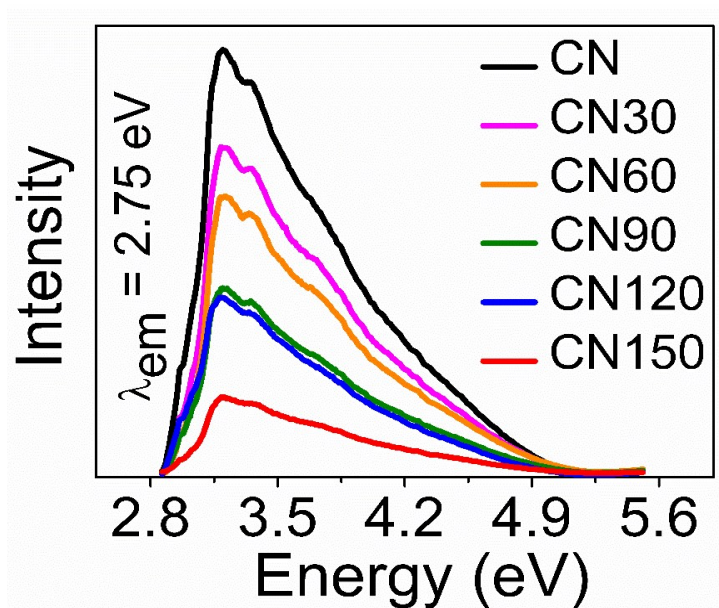


Fig. S1 PLE spectra of bulk and plasma treated samples

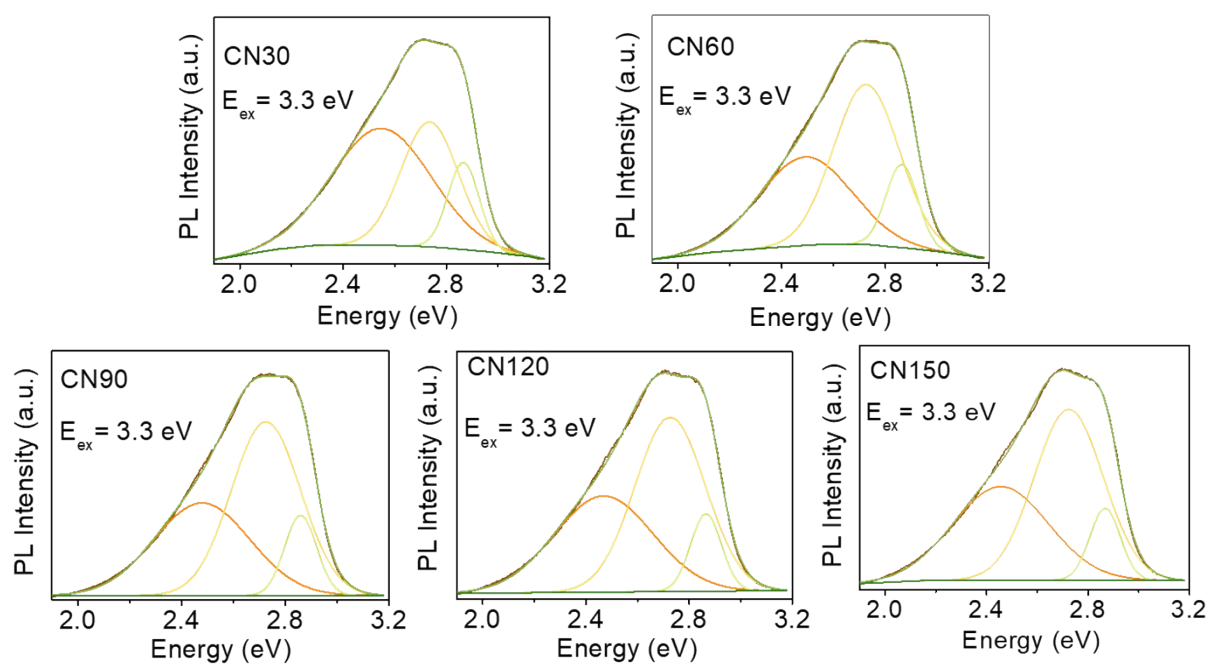


Fig. S2 Deconvoluted PL spectra of plasma-treated CN

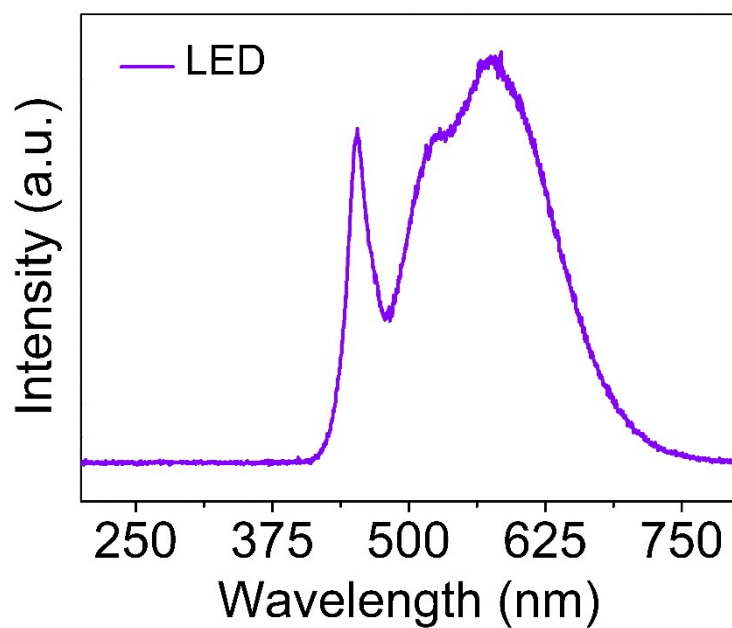


Fig. S3 OES spectrum of the white LED bulb.

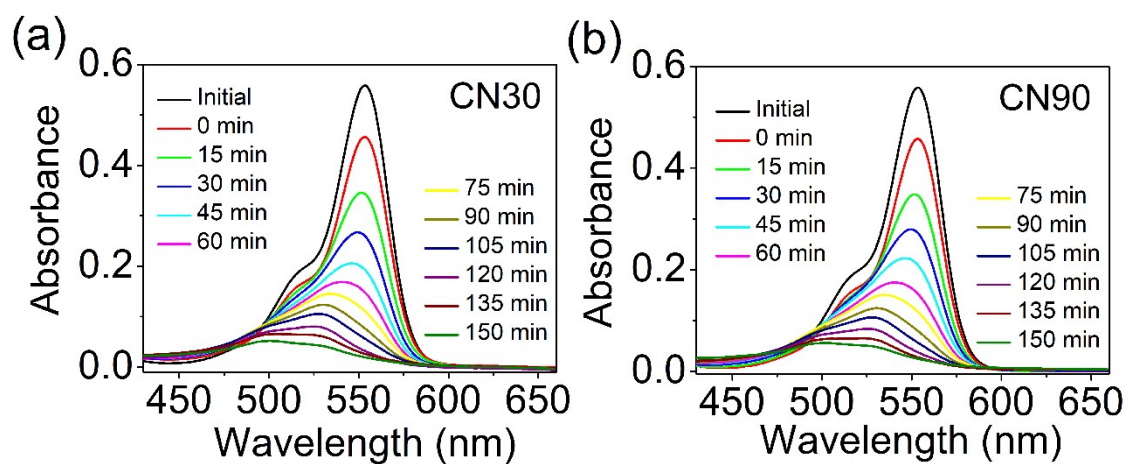


Fig. S4 Absorption spectra of RhB dye in presence of (a) CN30, (b) CN90 showing degradation of central peak at 553 nm.

Table

Table S1 Fitted results of C 1s and N 1s peaks for pure and plasma treated CN

Sample	Deconvoluted C 1s Peaks (eV)			Deconvoluted N1s Peaks (eV)			N _{2C} /N _{3C}
CN	284.76	288.01	288.76	398.50	399.50	400.9	1.94
CN30	284.72	288.15	289.05	398.62	399.54	400.9	1.67
CN120	284.71	288.07	289.07	398.68	399.92	401.1	3.03