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Supporting Information

Optimization of one-step and one-substrate synthesis of carbon nanodots by microwave pyrolysis

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1. Experimental section

1.1. Materials

PEG-200 and NaCl were purchased by Merck Co. Metronidazole was obtained from Alborz Darou Pharmaceutical Company (an Iranian company). To record the UV-Visible and PL spectrum, the original solutions of synthesized CND in different conditions were diluted with distilled water by thousand-fold. Therefore, the absorption and PL spectra were recorded with respect to distilled water as a reference to eliminate the effect of water as the solvent. The stock solution of MNZ was prepared in 500 ppm concentration. 10 ml of working solutions of MNZ containing 0.1 ml of CND can be obtained just by diluting the defined volume of stock solution with distilled water and the PL spectra can be recorded after stirring the solution immediately.

1.2. Preparation of CND

To study the role of water in the synthesis of CND two breakers, one of which containing 15 ml PEG-200 and the other including a mixer of 15 ml PEG-200 and 5 ml water, were irradiated in the microwave oven for the same time and power.

In order to optimize the irradiation time and power, CND samples were prepared as following: 20 ml PEG-200 was heated in a microwave oven for different irradiation times (2, 9 and 16 min) and powers (400, 540 and 700W) at 2450 Hz. Eventually, the solutions of the obtained CND were used without any additional processing. To obtain FT-IR spectrum of solid CND, suspended CND were separated from unpyrolyzed polymer as following: after adding saturated solution of NaCl, the sample was left overnight. Precipitated particles were separated by centrifugation and dried at 110 °C. After that it was washed three times with distilled water for removing excess amount of NaCl. Finally drying process was repeated again at the same condition.

1.3. Characterization methods

All absorption and fluorescence spectra of samples were recorded by T80 UV-Visible spectrophotometer (PG Instrument Ltd) with matched 1 cm quartz cells and LS50 spectrofluorimeter (Perkin Elmer) equipped with a Xenon lamp and 1 cm quartz cell,

respectively. Transmission electron microscope (TEM) (Philips EM208), X-ray diffraction (XRD) (ADP2000 ITASRUCURE Italia), FLUO-3 fluorescence microscope (BEL Engineering Italy) and infrared spectroscopy (FTIR) (Perkin Elmer) were used to characterize the CND.

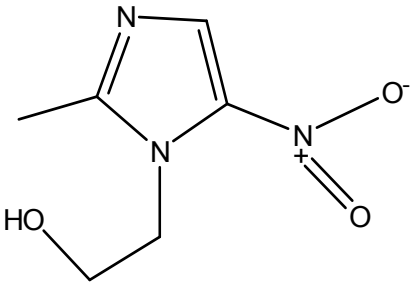


Figure S1. The chemical structure of MNZ.

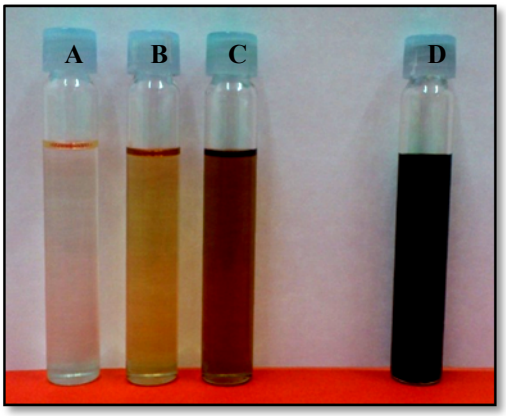


Figure S2. Photograph of prepared single substrate CND by different microwave treatment: (A): 2 min and 400W, (B): 2 min and 540W. (C): 2 min and 700W, (D): optimal condition (16 min and 540W).

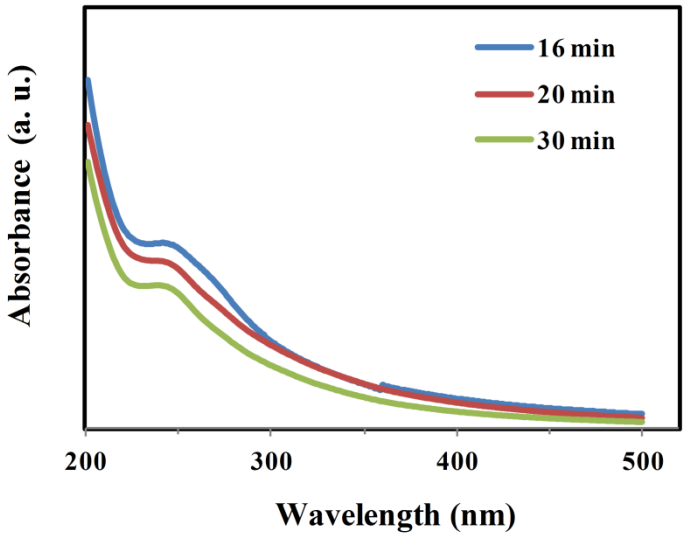


Figure S3. The absorption spectrum of single substrate CND made by a 540W microwave heating for different intervals time.

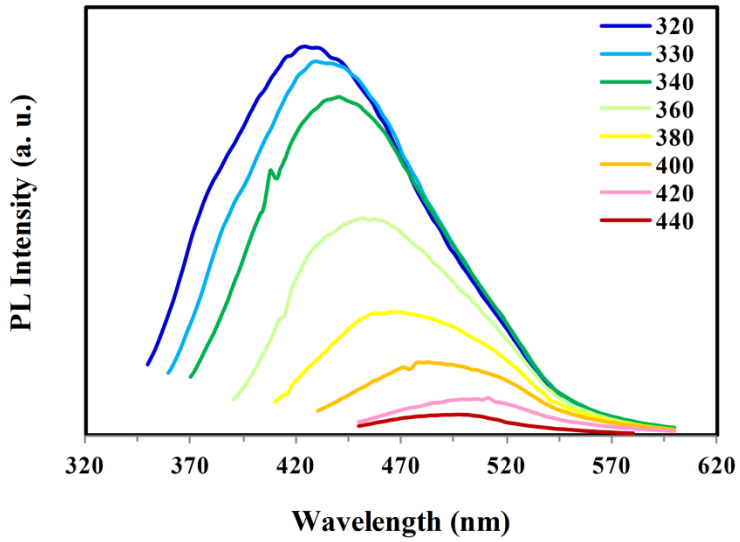


Figure S4. PL emission spectra of: CNDB. Excitation wavelength starts from 320 nm to 420 nm and increases in 20 nm increments.

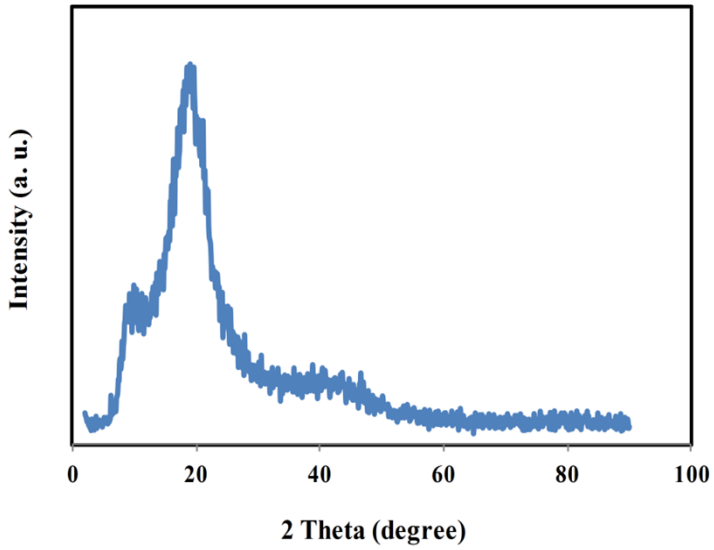


Figure S5. XRD pattern of the prepared CNDB.

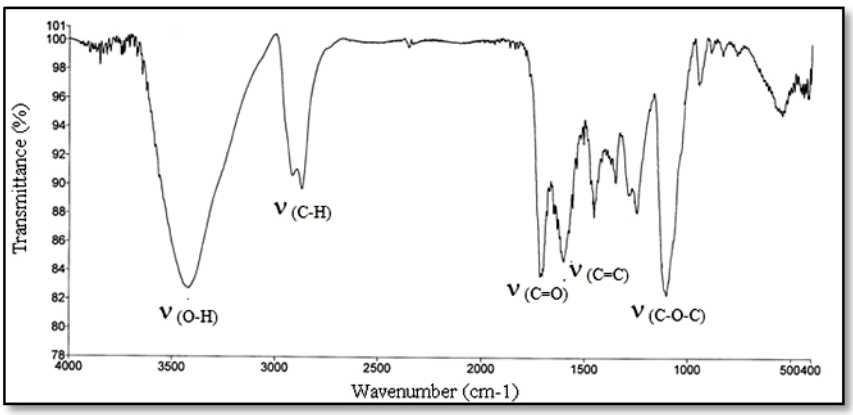
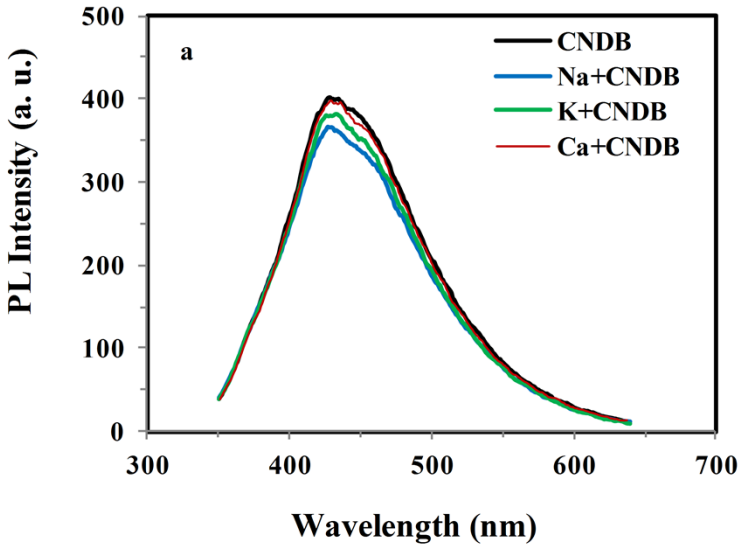


Figure S6. FT-IR spectrum of solid CNDB.



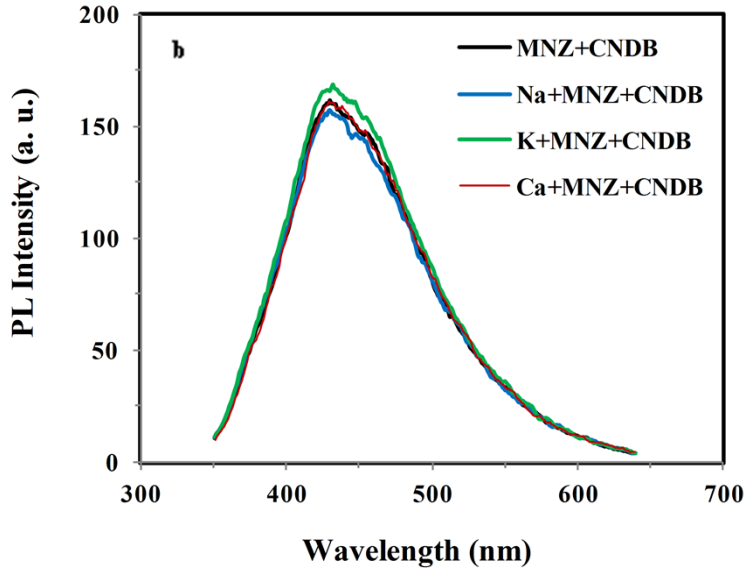


Figure S7. Effect of ionic contaminants on the PL intensity of CNDB alone (a) and CNDB+MNZ system (b). [MNZ]=10 ppm; and Na^{+}, K^{+}, Ca^{2+} at blood plasma concentration [22]. Excitation wavelength: 330 nm.