

Electronic Supplementary Data

A comparative study of the morphologies and photocatalytic performances of bis[5-(2-pyridyl)tetrazolato]diaquazinc(II) framework synthesized by hydrothermal and microwave methods

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Photocatalytic experiments

To measure the photocatalytic activity under UV irradiation, a 365 nm cutoff filter was used to provide the light. Typically a certain amount of MOFs as photocatalysts were taken in 25 mL of distilled water and sonicated for 5 min. Then $5 \times 10^{-5} \text{ mol L}^{-1}$ of MB was added to it, followed by the addition of two drops of hydrogen peroxide solution (H_2O_2 30%). The suspension was first magnetically stirred in the dark for 30 min to establish the adsorption–desorption equilibrium. During the degradation, the mixture was stirred continuously with a magnetic stirrer. At regular time intervals (20 min), a 1 mL solution was sampled, filtered and diluted to 10 mL in a volumetric flask. The absorption spectrum of MB aqueous solution was done on a Shimadzu UV-2450 UV-Vis spectrophotometer.

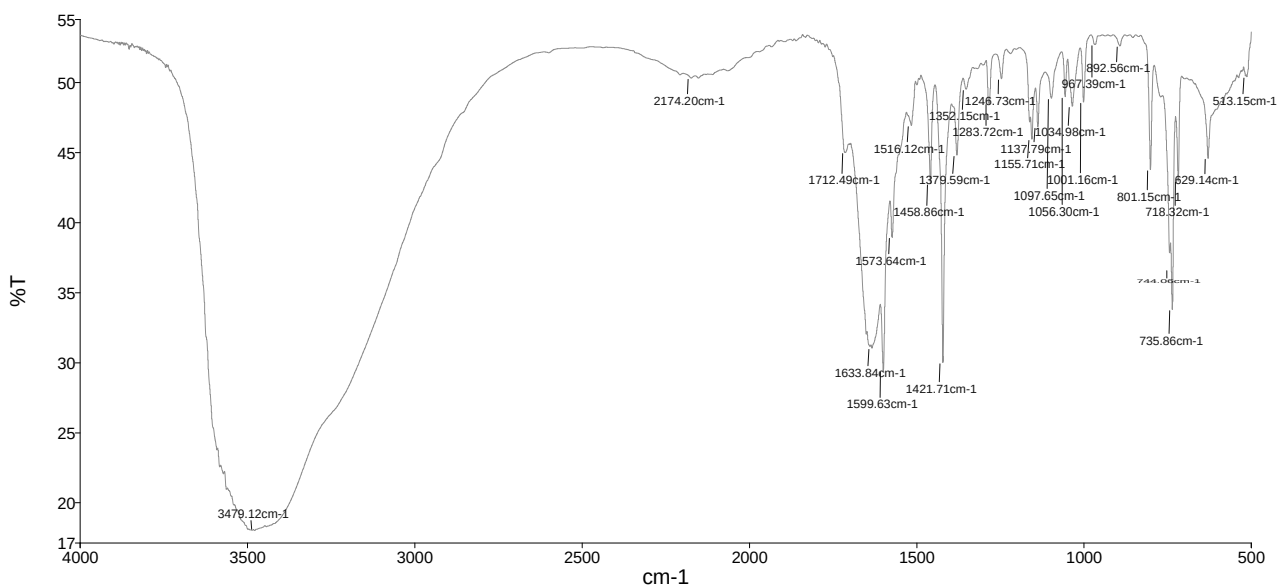


Fig. S1 – IR spectrum of compound (1).

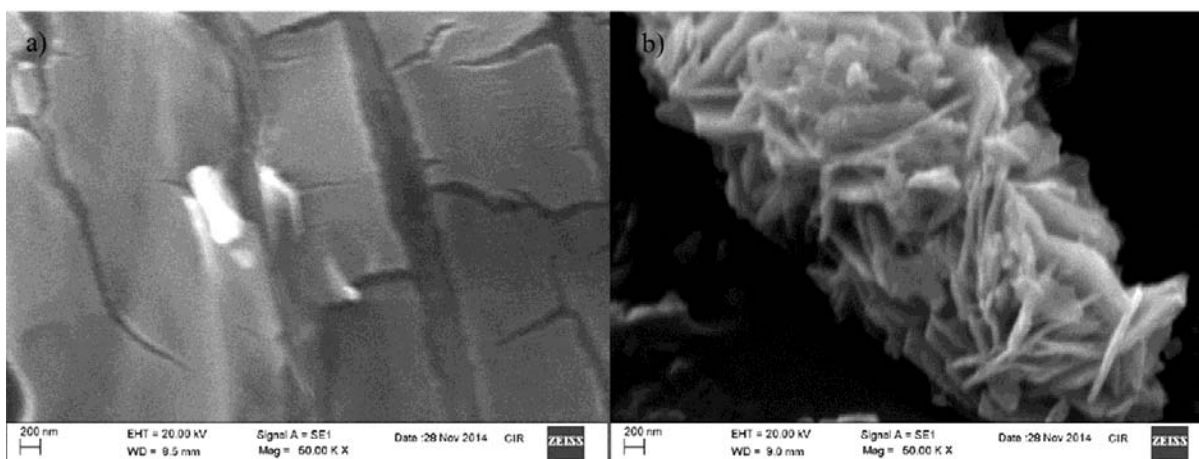


Fig. S2 – SEM images (magnified). [(a) CH-MOF-RH, (b) MW-MOF-NE].

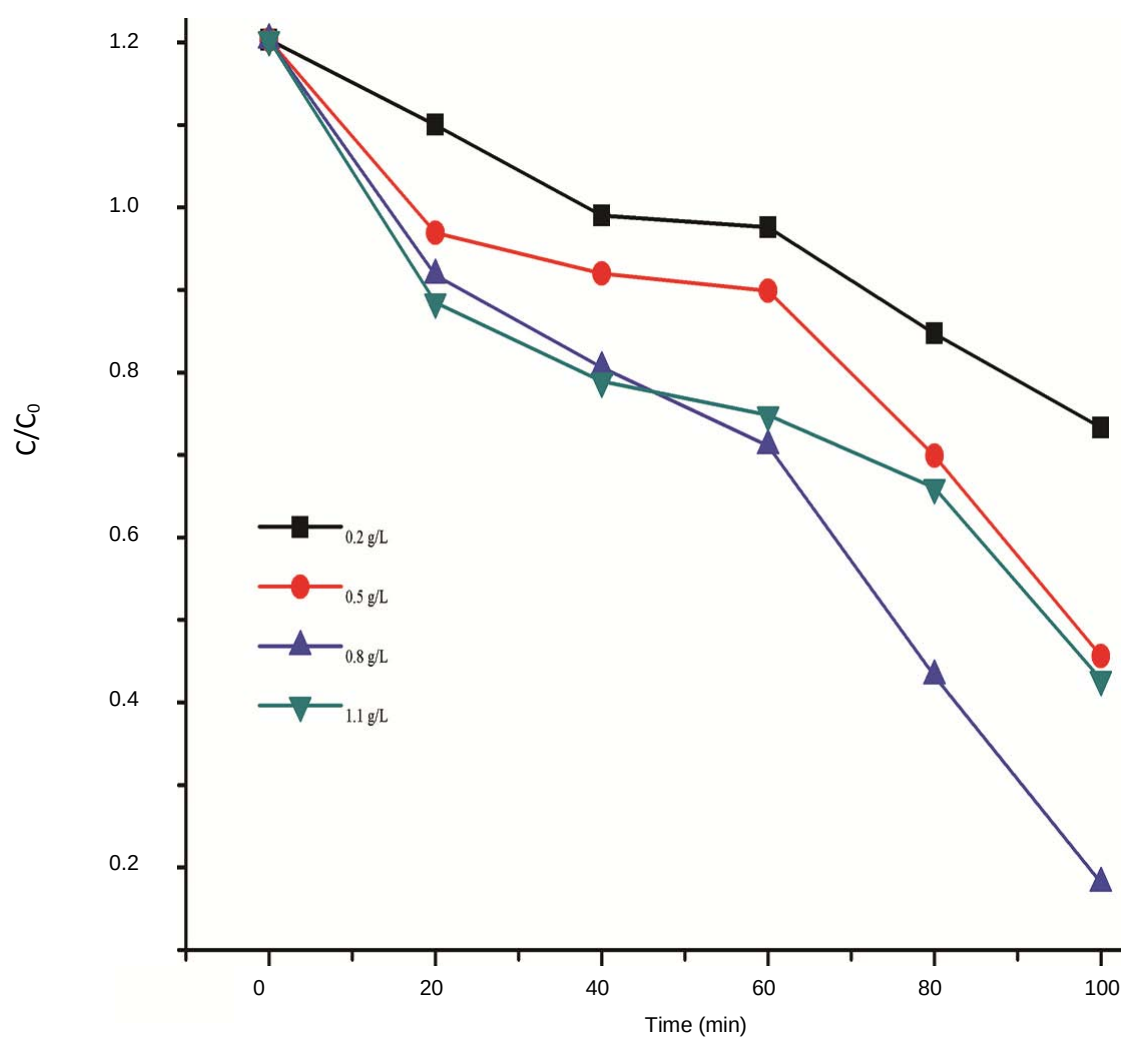
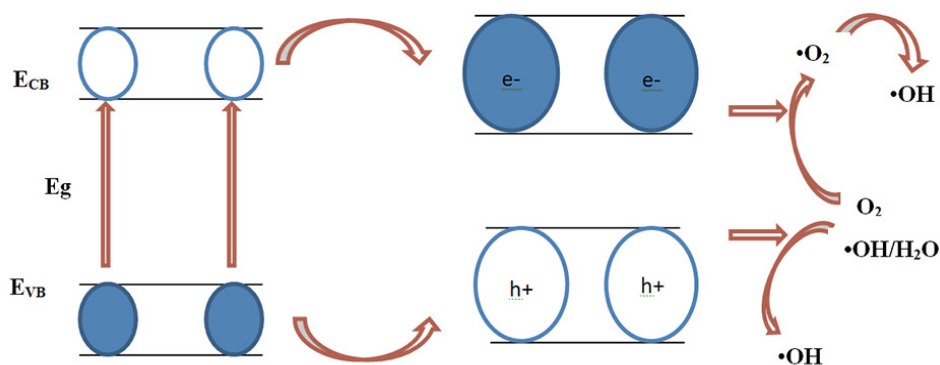


Fig S3 – Effect of MW-MOF-Zn photocatalyst dosage on dye degradation.

The photocatalytic mechanism of MW-MOF-NE and CH-MOF-RH is shown below (Scheme S1). Taking MW-MOF-NE for example, under UV-vis light irradiation, electrons (e^-) in the valence band (VB) of MW-MOF-NE were excited to its conduction band (CB) leaving behind same amount of holes (h^+) in VB. Oxygen radicals ($\cdot O_2^-$) would be formed first by the combination of electrons (e^-) with O_2 adsorbed on the surfaces of MW-MOF-NE, then they might transform to the hydroxyl radicals ($\cdot OH$). And hydroxyl (OH^-) adsorbed on the surfaces of MW-MOF-NE interaction with the hole (h^+) also can generate hydroxyl radicals ($\cdot OH$). Hydroxyl radicals ($\cdot OH$) could decompose effectively the organic dyes. It is notable that MW-MOF-NE and CH-MOF-RH show 14% and 2% degradation of organic dyes without H_2O_2 , while this figure increases to 99% and 43% in presence of H_2O_2 this is due to the generation of hydroxyl radicals. The generation speed of hydroxyl radicals from MW-MOF-NE becomes faster than that from CH-MOF-RH due to its 1-D elongated morphology.



Scheme S1-Schematic representation of photocatalytic mechanism of MW-MOF-NE