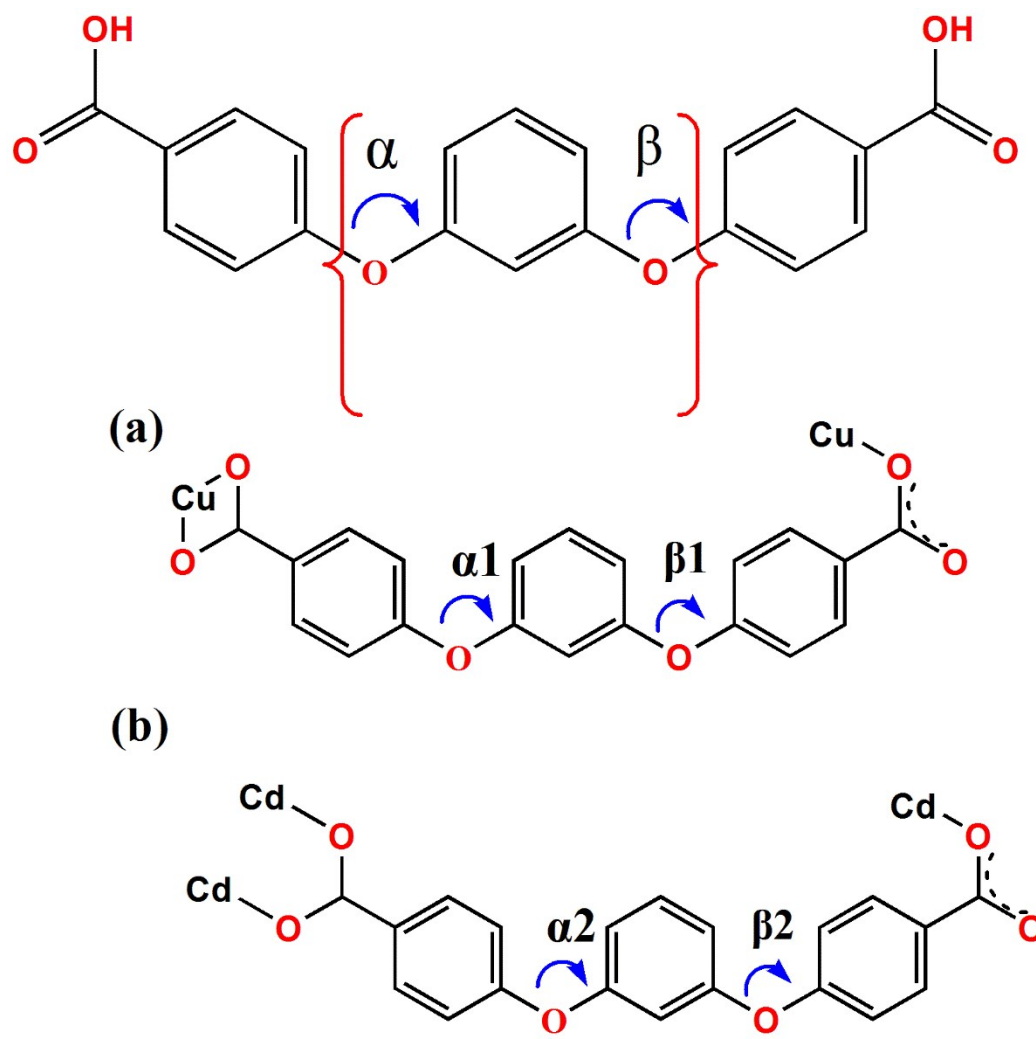


## Supporting Information

**1,3-bis(4'-carboxylatophenoxy)benzene and 3,5-bis(1-imidazolyl)pyridine derived Zn(II)/Cd(II) coordination polymers:**

**Synthesis, structure and photocatalytic properties**



Scheme S1 the main skeleton feature of  $H_2L$  and its coordination modes in the two CP2.

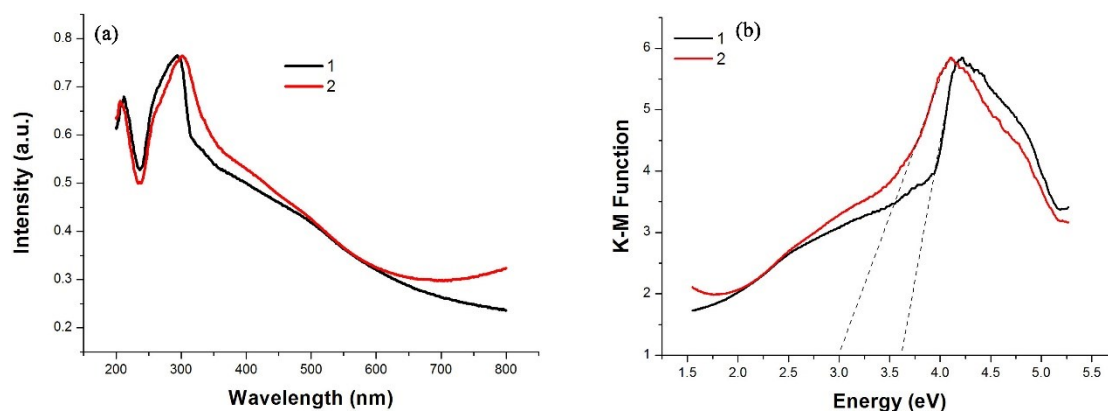


Fig. S1. (a) UV-vis absorption spectra and main absorption bands for CPs 1 and 2; (b) Diffuse reflectance spectra of Kubelka-Munk function vs. energy of the CPs 1 and 2.

To characterize the phase purity of the obtained bulky samples, powder X-ray diffraction (PXRD) experiments have been recorded at room temperature (Fig. S2). It can be clearly observed that the synthesized complexes exhibit similar PXRD patterns to the simulated ones except for some subtle differences, which can be due to the different orientation of the crystals in the powder samples. The results indicate the pure crystalline phases of the title complexes and after photocatalytic process have been successfully synthesized and collected.

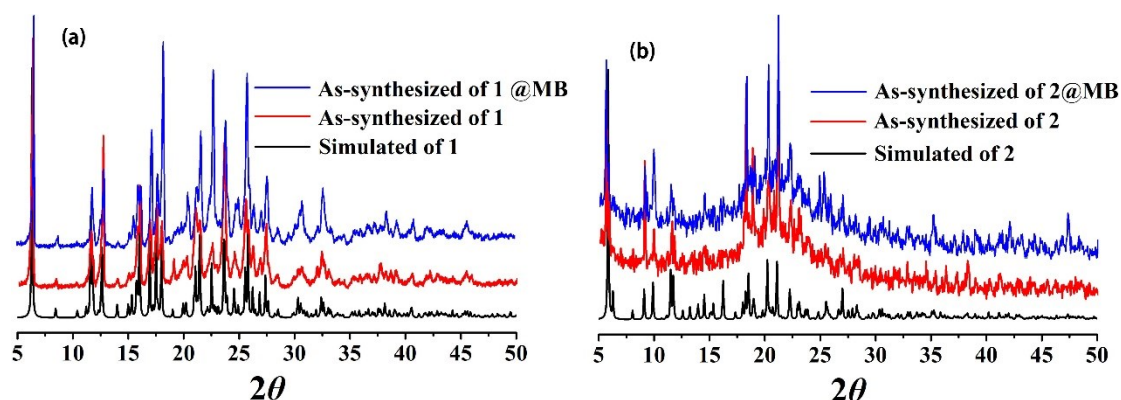


Figure S2 the powder X-ray diffraction (PXRD) patterns from the as-synthesized and after photocatalytic process of samples.

The IR spectra of complexes 1–2 are determined in the frequency range of 400–4000  $\text{cm}^{-1}$ , as shown in Fig. S3. For complexes 1 and 2, the peaks observed at 3400  $\text{cm}^{-1}$  suggest the presence of –OH groups of water molecules. The bands around 1607 and 1224  $\text{cm}^{-1}$  for 1, and 1618 and 1231  $\text{cm}^{-1}$  for 2 are characteristic of the asymmetric and symmetric vibrations of carboxyl groups. The strong peaks at 1488  $\text{cm}^{-1}$  for 1 and 1412  $\text{cm}^{-1}$  for 2, indicate the  $\nu_{\text{C-N}}$  stretching vibrations of the pyridyl ring of the bip ligand.

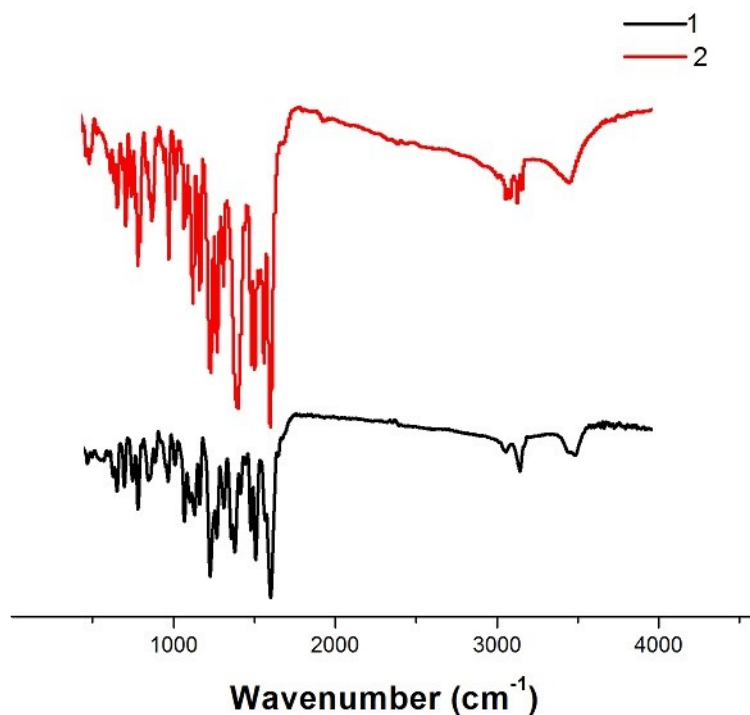


Figure S3 view of the IR spectra of CPs **1** and **2**.

Thermal gravimetric (TG) analyses were performed to examine the thermal stability of complexes **1–2**. The samples were performed in the temperature range of 30–800 °C under N<sub>2</sub> atmosphere with a heating rate of 10 °C min<sup>-1</sup> (Fig. S4). For complex **1**, the TG curve shows three step weight loss process. The first weight loss of 2.5% occurred in 30–139 °C, corresponding the release of lattice water molecules, which agree with the calculated value of 2.7%. The second weight loss from 306 to 541 °C, is attributed to the removal of H<sub>2</sub>L molecule. The third weight loss from 331 to 679 °C can be ascribed to the loss of bip organic ligands. The remaining product is assigned to ZnO (obsd. 11.7%, calcd. 12.5%). The first weight loss of 1.4% for **2** (calcd. 1.5%) at 54–121 °C and 30–182 °C are consistent with the removal of coordinated water molecule. Upon further heating, the frameworks of **3** and **4** begin to collapse after 321°C, corresponding to the release of organic ligands. The departure of the structures finally led to the formation of CdO (obsd. 21.32%, calcd. 22.26%).

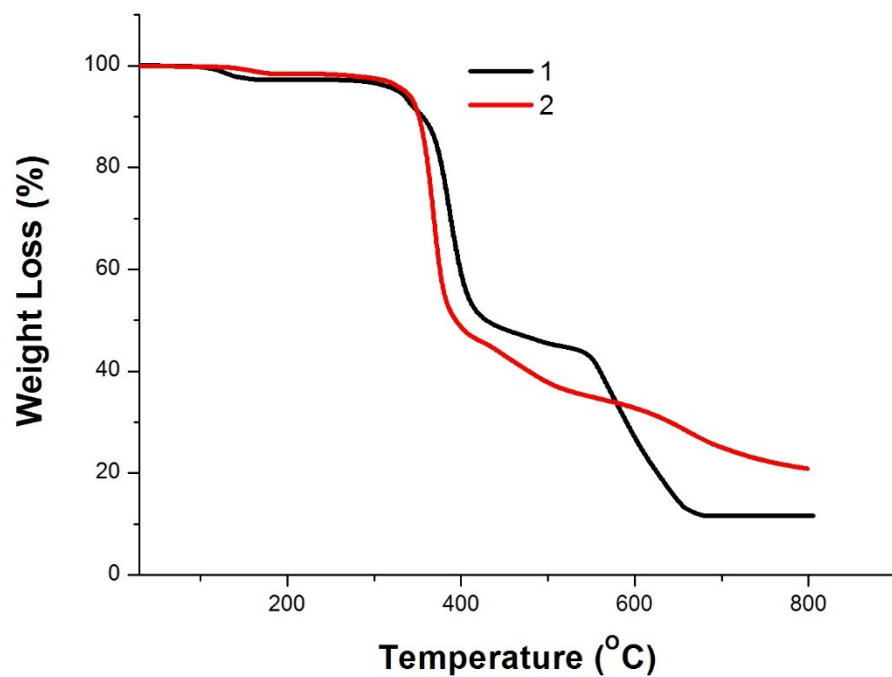
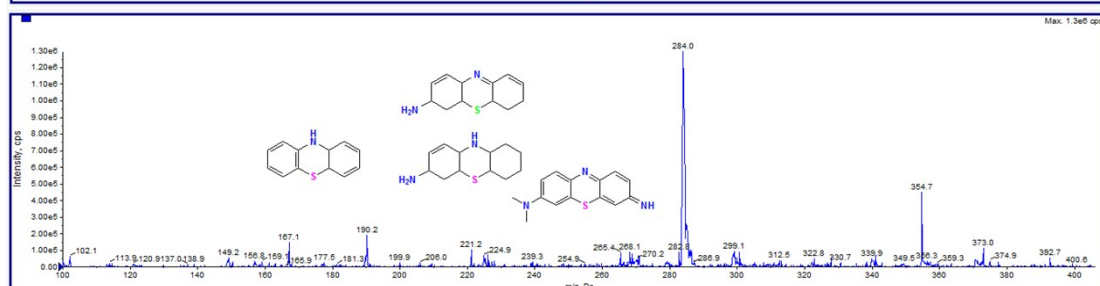
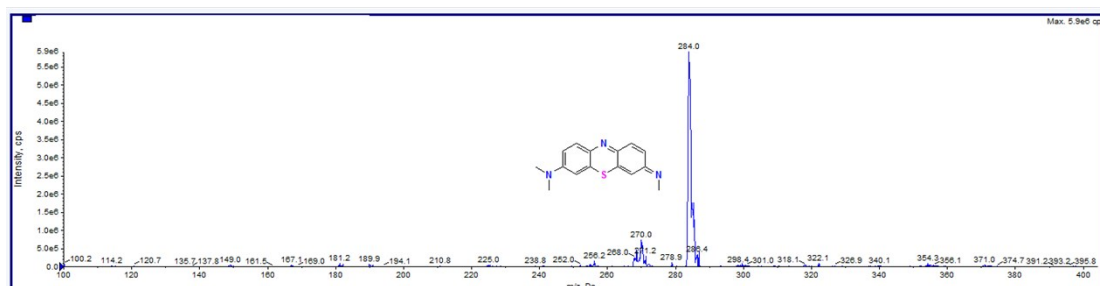
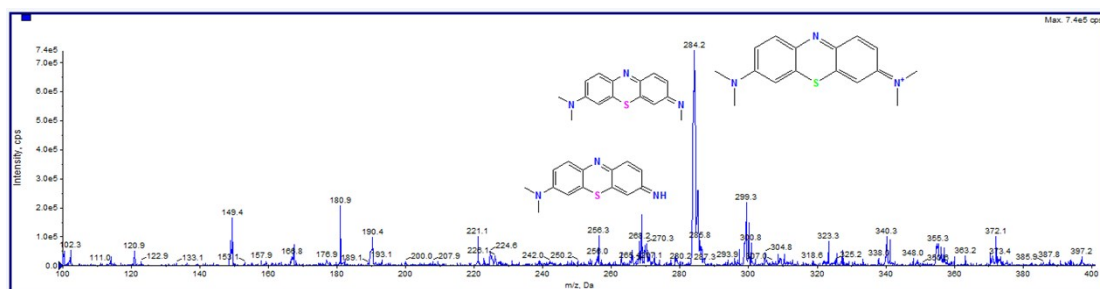


Figure S4 view of the TGA.



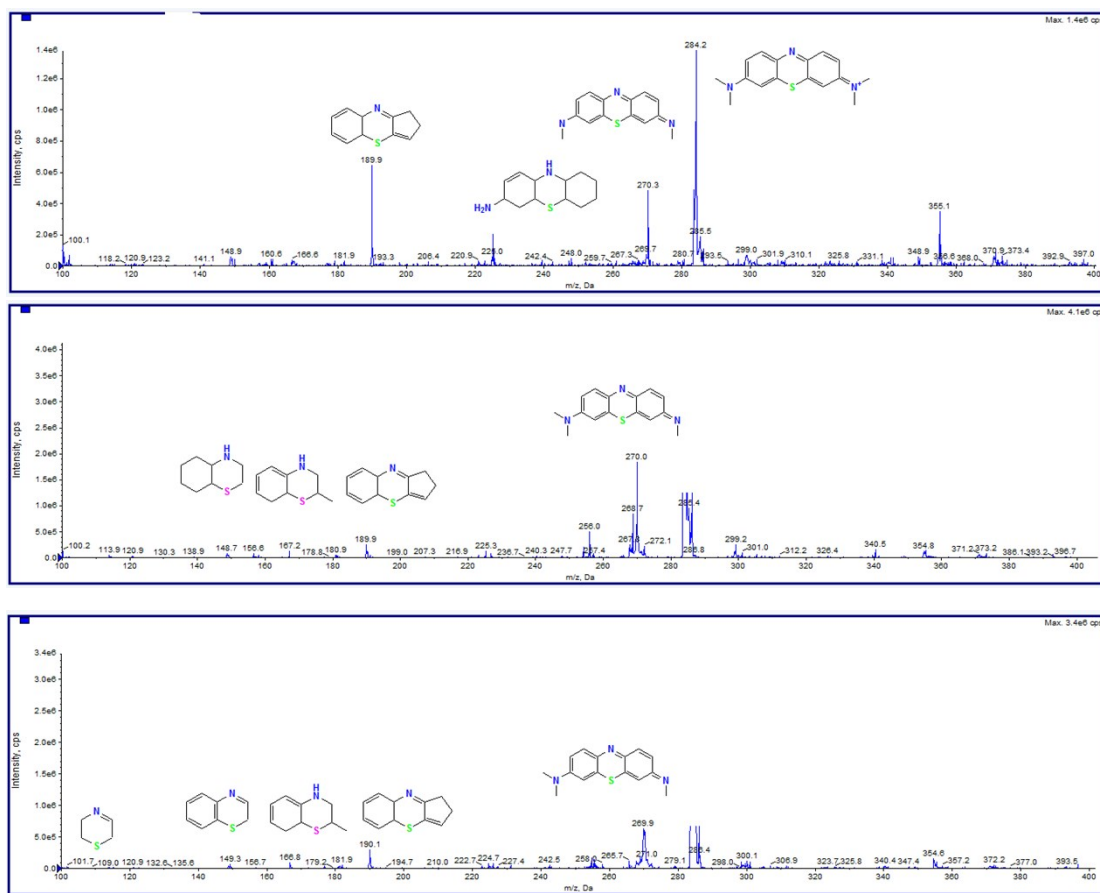
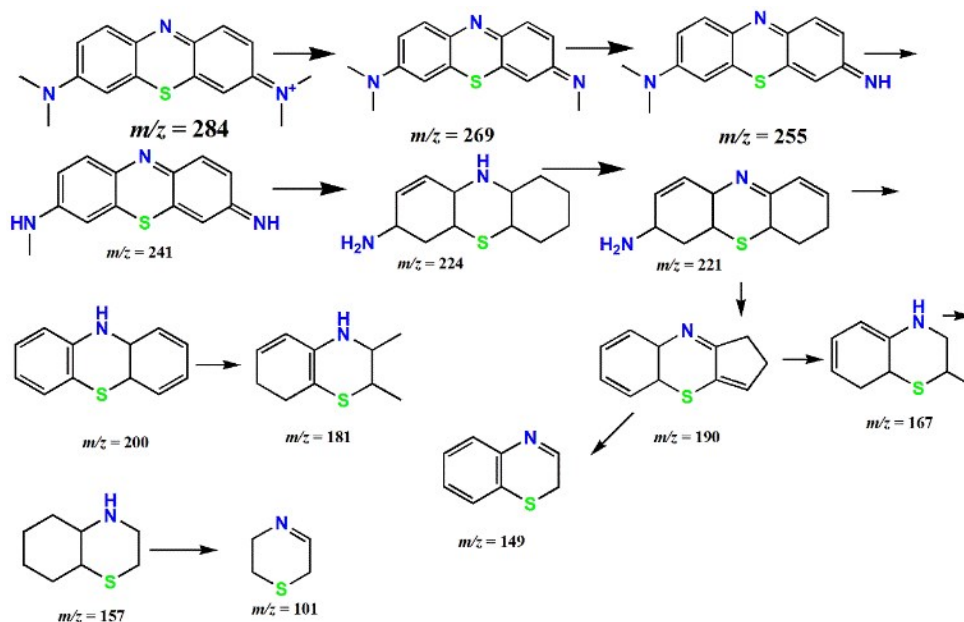


Figure S5 LC-MS spectra for the possible reaction intermediates and the final products of the photocatalytic oxidation of MB.



Scheme S2 Possible reaction pathways of the photodegradation of MB.