

## Electronic supplementary information (ESI)

### Equations and models:

#### Crystal size estimation by Scherrer's equation (S1):

$$D = \frac{K \lambda}{\beta \cos \theta} \quad (\text{S1})$$

where  $K = 0.9$  is the shape factor,  $\lambda$  is the X-ray wavelength of Cu  $K\alpha$  radiation (1.54Å),  $\theta$  is the Bragg diffraction angle, and  $\beta$  is the FWHM of the respective diffraction peak.

#### Zero point charge

pHzpc of present adsorbent was calculated as follows: A series of Erlenmeyer flasks (100 mL) were partially filled with saltpeter\* solution (50 mL of 0.01M). To each saltpeter solution containing flasks, 0.5 g L<sup>-1</sup> amount of Cu-ZnBO-Cp-CT was added, and pH was maintained in ranged 2-10, respectively. These pHs were considered as initial pH of solutions. All the flasks were shacked at 190 rpm and room temperature for a day on to the water bath shaker. Afterwards, the final pH of each solution was noted down and the difference in pHs were used to calculate the pHzpc of the Cu-ZnBO-Cp-CT.

Figures

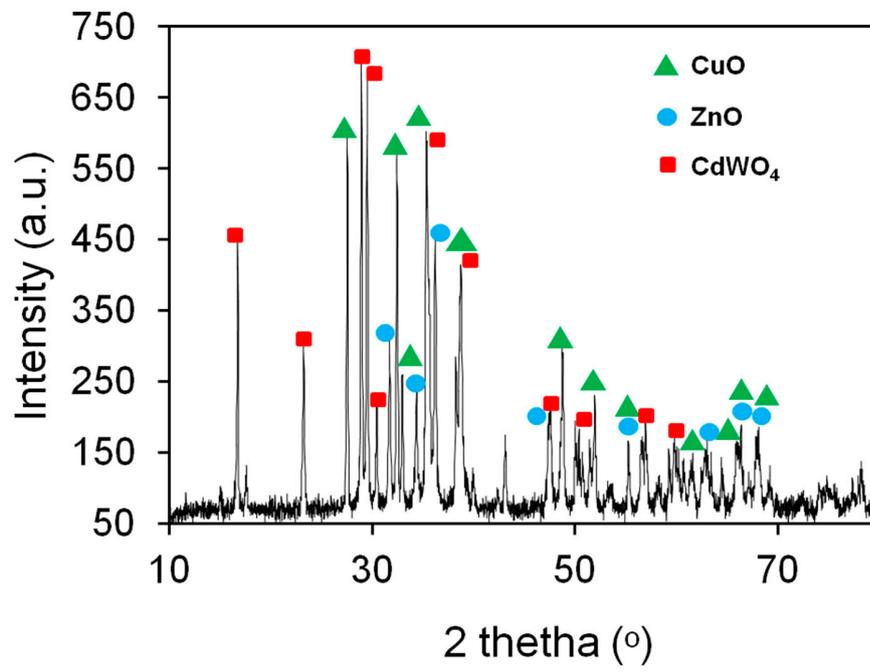
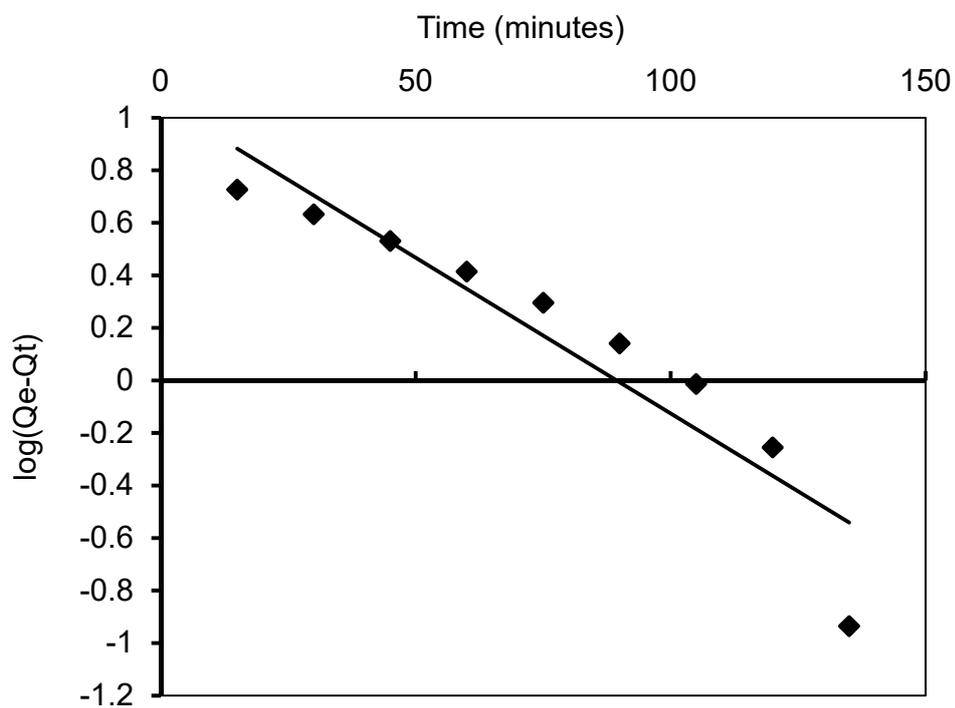


Figure S1.

XRD of Cu-ZnBO-Cp-CT NPs calcined at 600 °C.



**Figure S2.**

Plot of PFO kinetic for CR adsorption onto the Cu-ZnBO-Cp-CT.

**Table S1.** EDAX analysis of Cu-ZnBO-Cp-CT.

| <b>Order</b> | <b>Detected elements</b> | <b>Weight (%)</b> | <b>Atomic (%)</b> |
|--------------|--------------------------|-------------------|-------------------|
| 1.           | O                        | 22.30             | 59.06             |
| 2.           | Cu                       | 27.43             | 18.28             |
| 3.           | Zn                       | 22.52             | 14.60             |
| 4.           | Cd                       | 11.41             | 4.30              |
| 5.           | W                        | 16.33             | 3.76              |