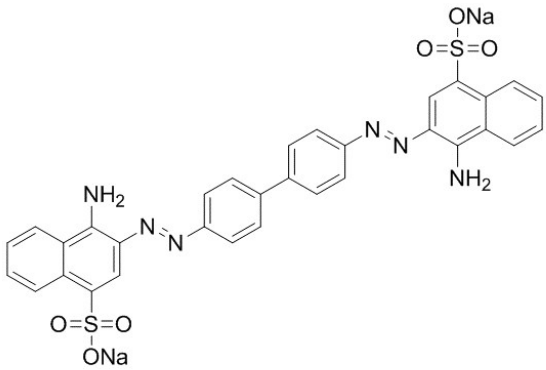
Supporting Information:

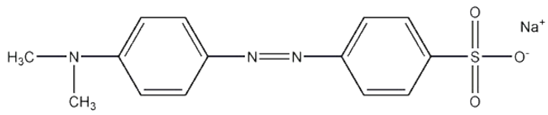
Three hierarchical porous magnesium borate microspheres: a serial preparation strategy, growth mechanism and excellent adsorption behavior for Congo Red

Rui-Feng Guo#, Yan-Qing Ma#, Zhi-Hong Liu *

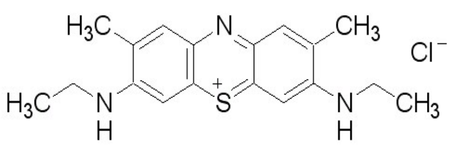
Key Laboratory for Macromolecular Science of Shaanxi Province, School of Chemistry and Chemical Engineering, Shaanxi Normal University, Xi'an 710062, PR China



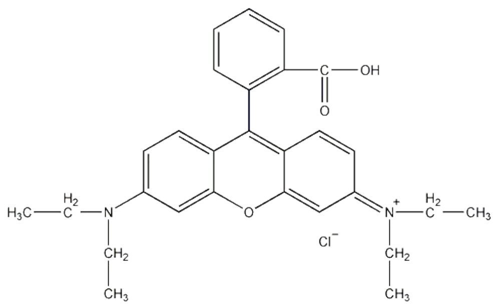
CR



MO



MB



RhB

Fig.S1. The molecular structures of dyes

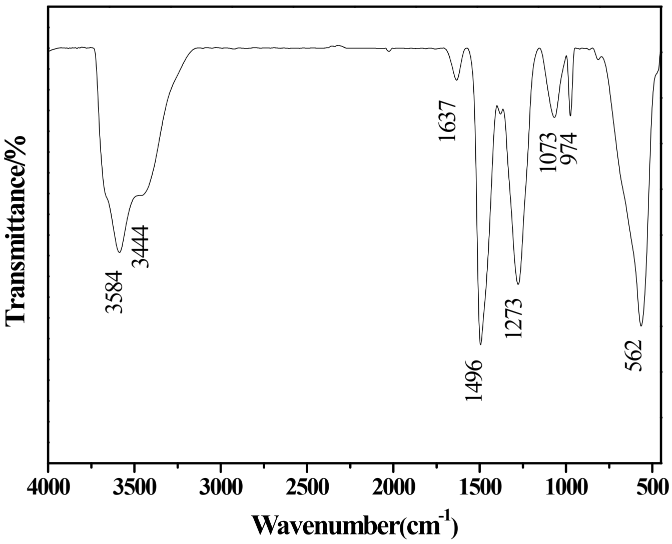


Fig.S2. FT-IR spectrum of the prepared MBH sample

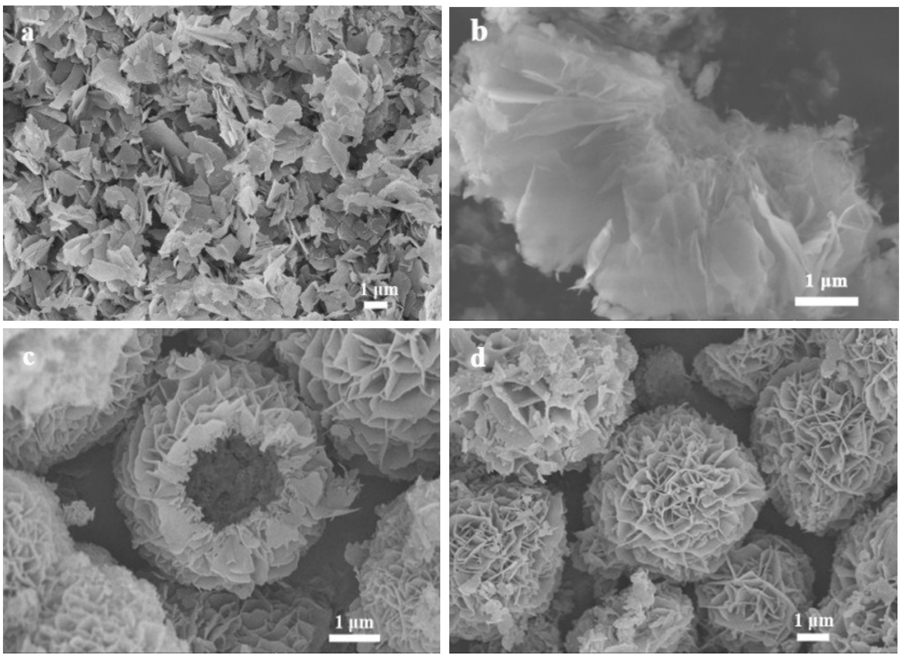


Fig.S3. SEM images of the prepared MBH samples at different reaction times:

(a) 6 h, (b) 13h, (c) 20 h, (c) 24 h.

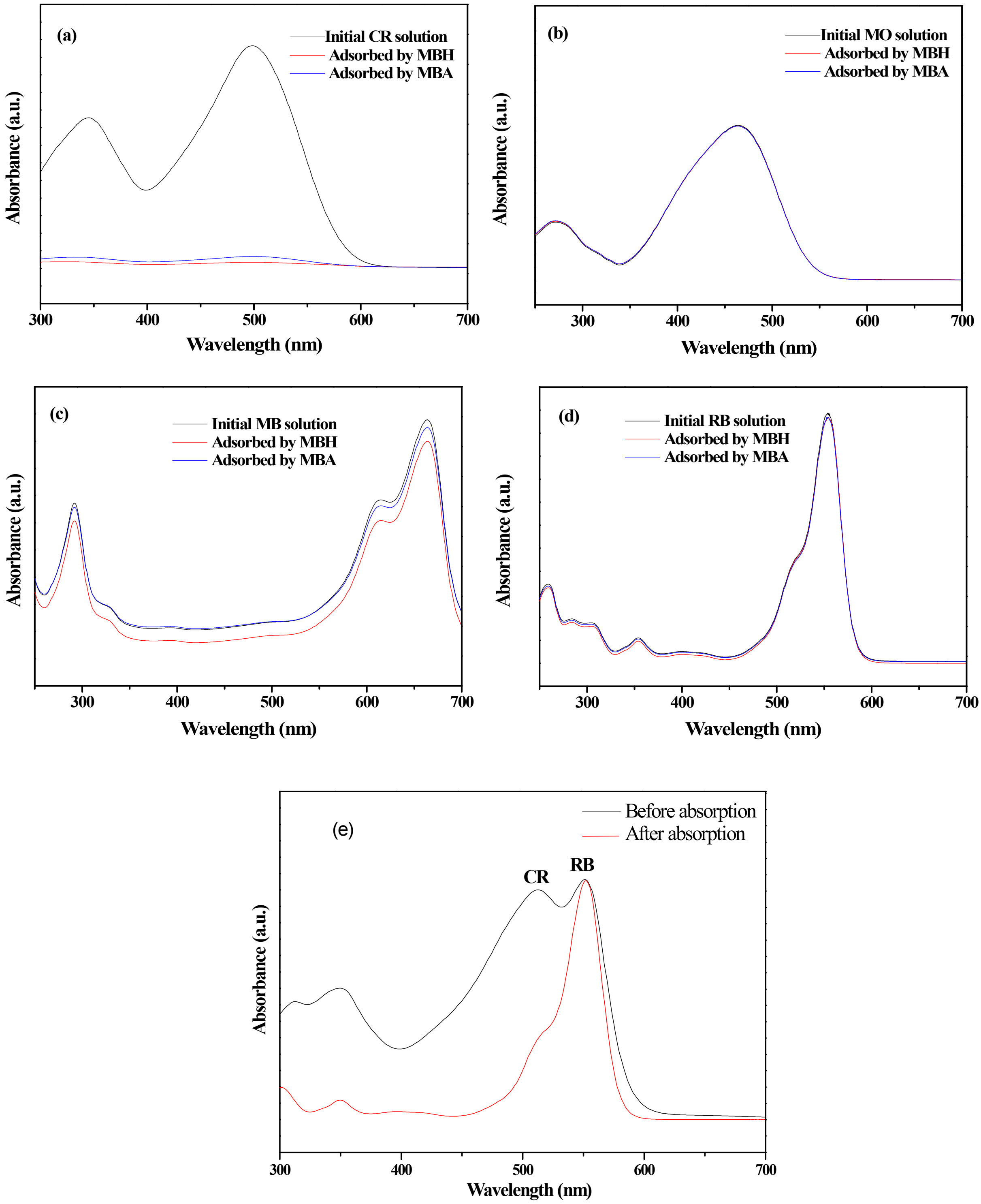


Fig.S4. UV-vis absorption spectra of 10 mL different organic dyes with initial concentration of 20 mg L^{-1} before and after being treated by 5 mg of MBH or MBA sample: (a) CR; (b) MO; (c) MB; (d) RB; (e) CR+RB.

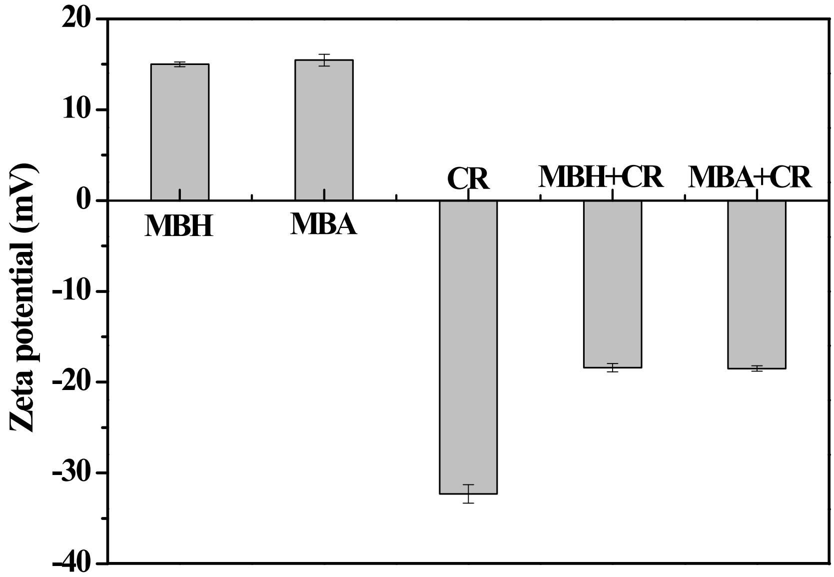


Fig.S5. Zeta potentials of the MBH, MBA, CR and the interaction of MBH and MBA with CR, respectively

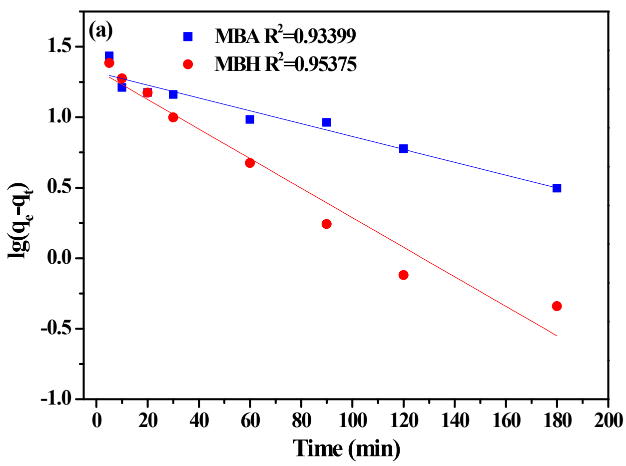


Fig.S6. Pseudo-first-order kinetic for adsorption of CR onto the MBH and MBA nanostructures

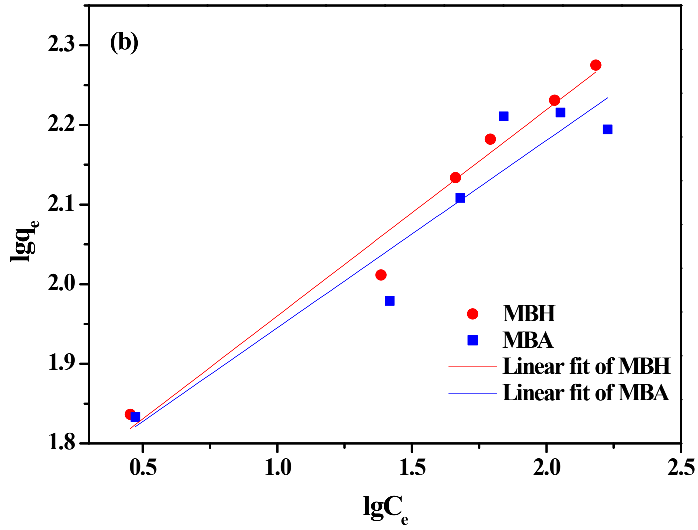


Fig.S7. Plot of lgq_e versus lgC_e for fitting via the Freundlich isotherm adsorption model.

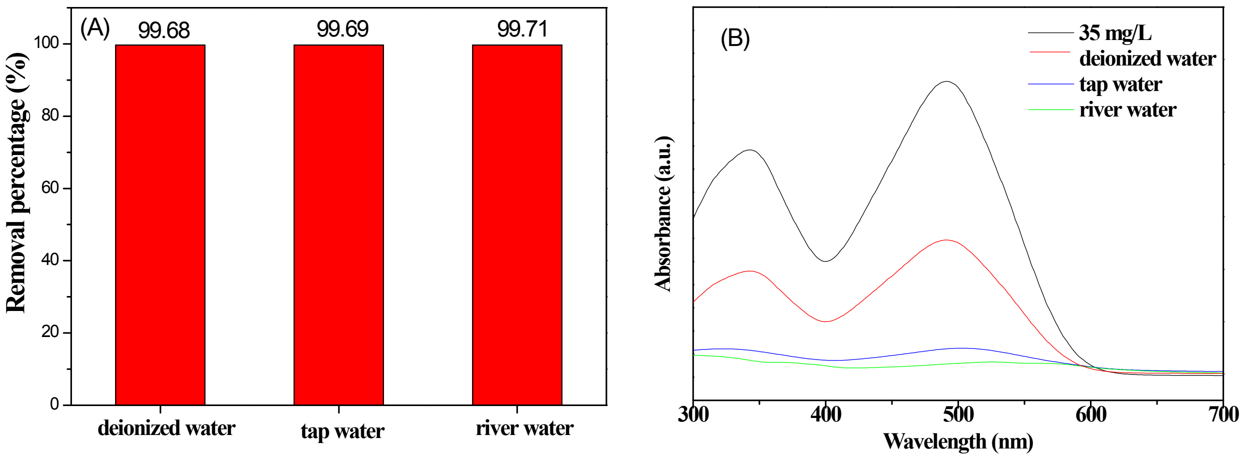


Fig.S8. (A) Effect of the CR solutions prepared by using tap and river water on CR removal efficiency by the prepared MBH nanostructure treated for 5 h, keeping others conditions unchanged. (B) The UV-vis absorption spectra of CR solutions prepared by using tap and river water with initial concentrations of 35 mg L^{-1} after being treated by the MBH nanostructures for 30 min.

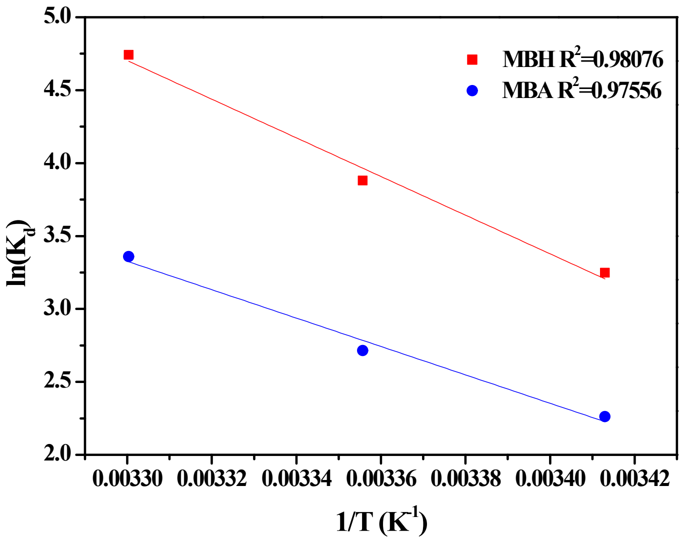


Fig.S9. Plots of $\ln(K_d)$~1/T for CR adsorption on the MBH and MBA nanostructures.

Table S1 Pseudo-first-order kinetic constants of CR onto the MBH and MBA nanostructures

Samples	$q_{e,exp}$(mg/g)	pseudo-first-order models		
		$q_{e,cal}$(mg/g)	k_1($\times 10^{-3}$ min^{-1})	R_1^2
MBH	69.78	21.67	24.14	0.95375
MBA	64.01	20.84	10.50	0.93399

Table S2 Kinetic parameters of intra-particle diffusion model at different linear curves of samples

Samples	Linear	c (mg g^{-1})	K_d (mg g^{-1} h$^{-0.5}$)	R^2
MBH	MBH-1	37.01	31.66	0.92748
	MBH -2	48.69	15.97	0.98667
	MBH -3	67.72	0.92	0.99957
MBA	MBA -1	27.47	40.15	0.49292
	MBA -2	42.58	10.56	0.73065
	MBA -3	48.07	7.19	0.97951