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Supporting Information for

Porous magnetic carbon sheets from biomass as super adsorbents for fast removal of organic pollutants from aqueous solution

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Kinetic Model.

Pseudo-First- and Pseudo-Second-Order Model.

The linear form of pseudo-first-order rate equation is

$$log(q_e - q_t) = log\, q_e - \frac{k_1}{2.303}t$$

where q_e and q_t are the amounts of dye adsorbed (mg/g) at equilibrium and time t (min), respectively; K_1 is the rate constant (min^{-1}) of the pseudo first-order kinetic model.

A linear form of pseudo second-order kinetic model is express

$$\frac{t}{q_t} = \frac{1}{k_2 q_e^2} + \frac{t}{q_e}$$

where k_2 is the rate constant(g/(mg·min)) of pseudo second-order kinetic model for adsorption.

Isotherm Model.

The Langmuir isotherm is often applicable to a homogeneous adsorption surface with all the adsorption sites having equal adsorbate affinity and is represented by the following equation:

$$q_e = \frac{q_m b C_e}{1 + b C_e}$$

while the Freundlich isotherm model assumes heterogeneity of adsorption surfaces, expressed by the following equation:

$$q_e = K_F (C_e)^n$$

where q_e and *Ce* are the amount of organic pollutants adsorbed per unit weight of adsorbent (mg/g) and the equilibrium concentration (mg/L), respectively; *b* is the constant related to the free energy of adsorption (L/mg), and q_m is the maximum adsorption capacity; K_F is the Freundlich constant indicative of the relative adsorption capacity of the adsorbent (mg/g), and (*n*) is the adsorption intensity.

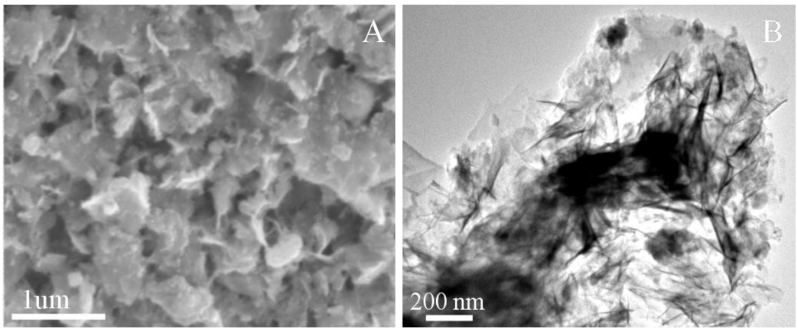

Fig. S1. SEM (A) and TEM (B) images of the PMCS after eight adsorption cycle.

We can see that the morphologies of PMCS were slight change, but a more complete layered structure and pore structures remains substantially after eight adsorption cycle. Therefore, we speculate that sheet structure of PMCS is stable under our experiment condition.

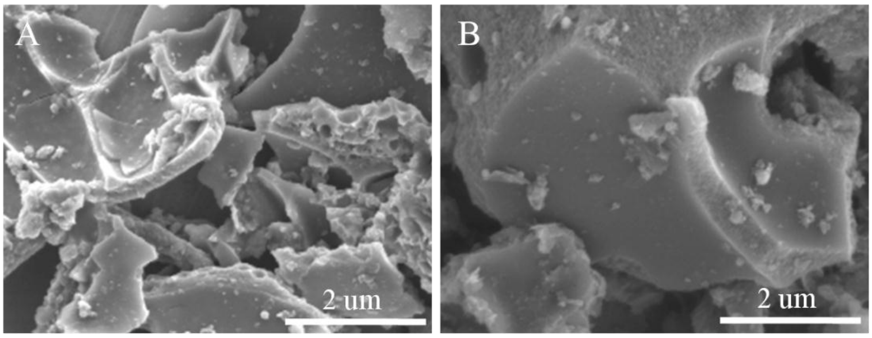

Fig. S2. The SEM images of the samples in the presence of Al(NO3)3 (A) and Fe(NO3)3 (B).

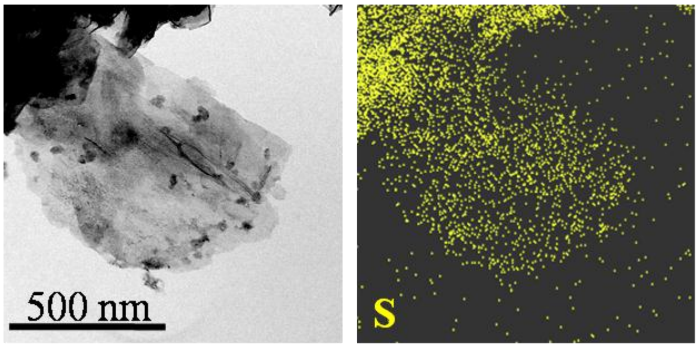

Fig S3. The elemental S mapping on the PMCS after adsorption MB.

Fig. S4 Photos of magnetic separatation and dispersion of PMCS

From Fig. S4, PMCS dispersed in water could be rapidly separated by a magnet and then re-dispersed easily with a slight shake once the magnet was removed. (See Fig. S4) It suggested that PMCS possess excellent magnetic properties and are also highly water-dispersive, which was an advantage for their applications.

Table S1. Kinetic parameters of pseudo first-order and second-order adsorption kinetic models and weber-morris model for MB, MO and CV sorption on PMCS.

		pseudo-first-order model			pseudo-second-order model			Intra-particle diffusion		
dye	$q_{e,exp}$ (mg/g)	k_1 $(min)^{-1}$	$q_{e,cal}$ (mg/g)	R^2	k_1 $(min)^{-1}$	$q_{e,cal}$ (mg/g)	R^2	K_i $(min/(mg/min^{1/2})$	C (mg/g)	R^2
MB	765	0.1431	658.61	0.945	0.0072	773.65	0.999	2.8959	730.91	0.957
MO	696	0.1393	531.38	0.968	0.0062	689.74	0.998	1.1191	685.81	0.943
MV	790	0.1454	691.35	0.977	0.0068	806.45	0.999	2.9467	764.33	0.982

To further understand the characteristics of the adsorption process, kinetic models such as pseudo-first-order and pseudo-second-order were exploited to analyze the experimental data. The calculated kinetics parameters for the removal of dye on

PMCS were listed in Table S1. It was found that the R^2 values of the pseudo-second-order model are much higher than those of pseudo-first-order model, the calculated $q_{e,cal}$ values of the pseudo-second-order model are close to experimental $q_{e, exp}$. Hence, the pseudo-second-order kinetic model is more suitable for describe the adsorption behavior of MB, CV and MB over PMCS.

Table S2. Comparison of the adsorption capacities of MB, MO and CV onto various adsorbents.

Dyes	**Adsorbents**	**Adsorption capacity (mg/g)**	**Ref.**
MB	anaerobic granular sludge	212	1
	graphene/magnetite composite	43.08	2
	CNTs-A	400	3
	copper silicate hollow spheres	162	4
	Metal silicate nanotubes	400	5
	PMCS	1615.9	This work
MO	hyper-cross-linked polymeric	70	6
	silkworm exuviae	87	7
	chitosan/Fe_2O_3/CNTs	66	8
	CNTs-A	149	3
	PMCS	1062.4	This work
CV	opal-dye sludge	101.13	9
	Grapefruit peel	254.16	10
	Magnetic nanocomposite	81.7	11
	Sulfuric acid activated carbons	85.84	12
	PMCS	1728.3	This work

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