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Bamboo-like carbon nanotubes derived from colloidal polymer nanoplates for efficient removal of Bisphenol A

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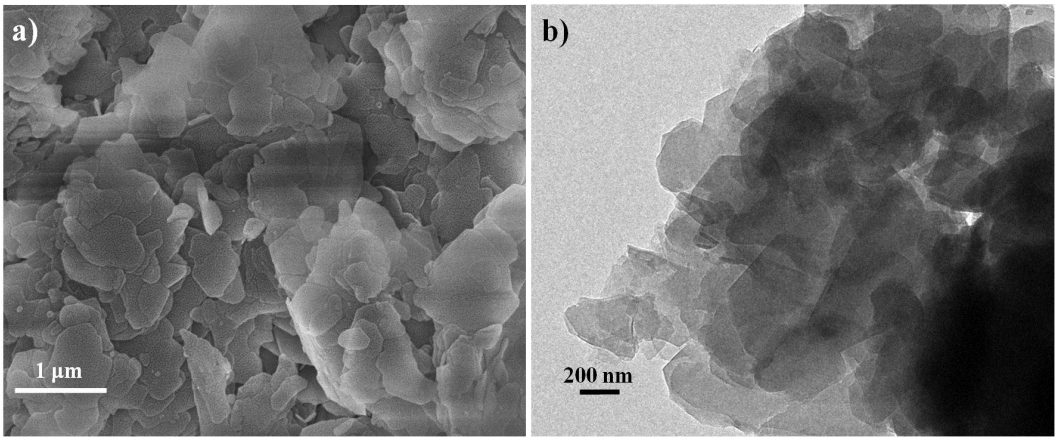

Fig. S1. a) SEM and TEM b) images of the PEI-MCA polymer.

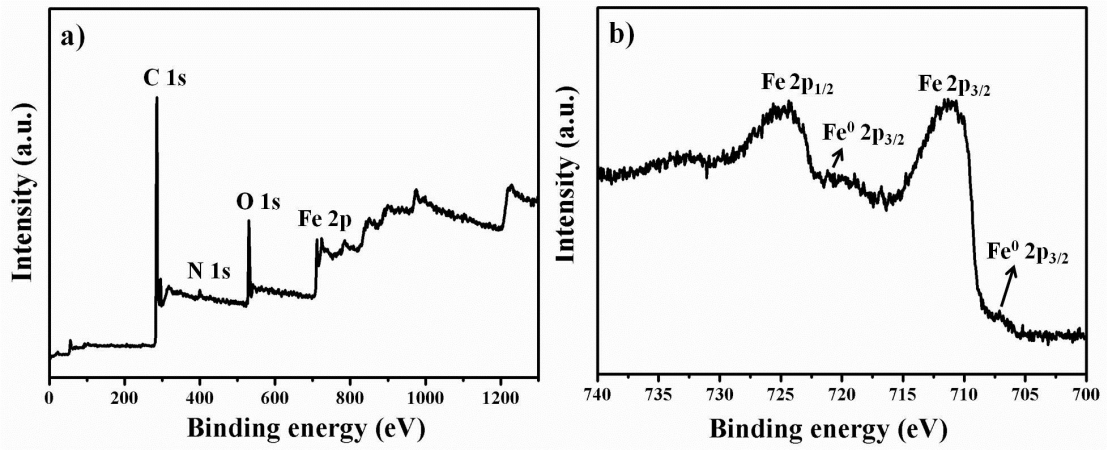

Fig. S2. a) XPS survey of the b-CNTs, indicating the presence of C, N, O and Fe elements; b) Fe 2p XPS spectrum.

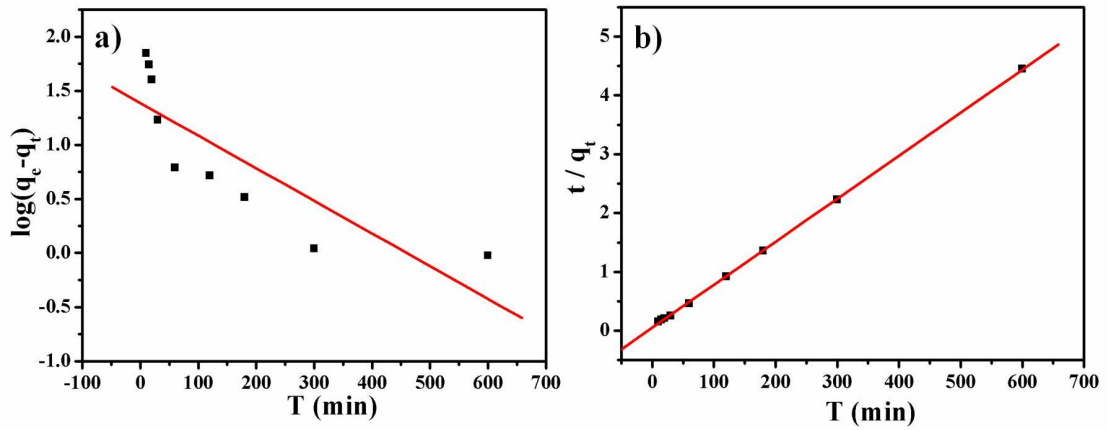

Fig. S3. a) Pseudo-first-order and b) Pseudo-second-order kinetic plots for BPA

adsorption onto b-CNTs.

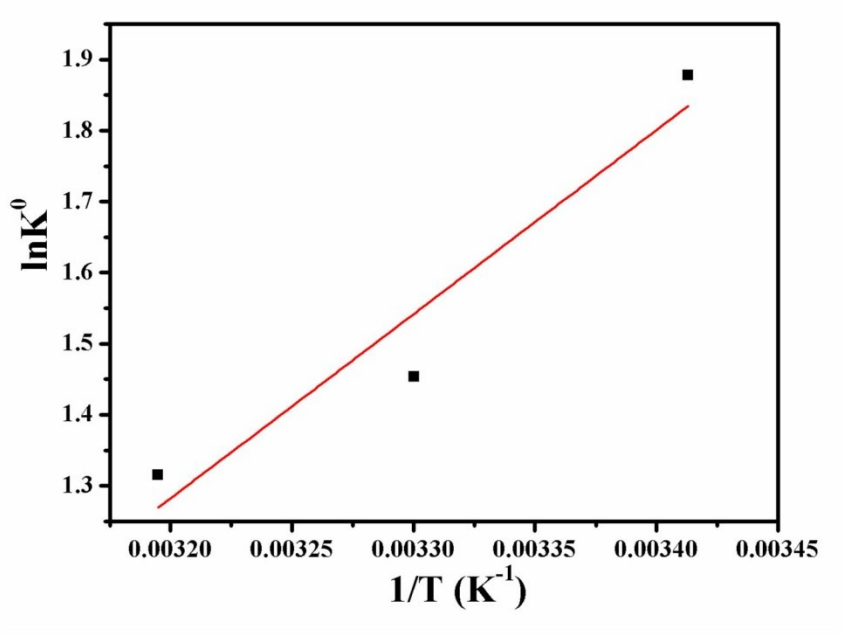

Fig. S4. Linear plot of ln *K*° vs. 1/*T* for the adsorption of BPA on b-CNTs at 293, 303 and 313 K.

Table S1 Adsorption kinetic parameters of BPA onto b-CNTs.

Initial conc. C_0 (mg•L^{-1})	Pseudo-first-order			Pseudo-second-order			R^2
	K_1 (min^{-1})	$Q_{e,cal}$ (mg/g)	R^2	$Q_{e,cal}$ (mg/g)	K_2 g/(mg•min)	$Q_{e,exp}$ (mg/g)	
70	0.007	24.39	0.689	136.799	0.001	135.772	0.999

Thermodynamics

The distribution coefficient (K_d) was calculated by the following formula:

$$K_d = \frac{C_0 - C_e}{C_e} \times \frac{\mathrm{V}}{\mathrm{m}} \qquad (1)$$

where C_0 (mg/L) is the initial concentration and C_e (mg/L) is the equilibrium concentration of BPA after adsorption, V is the solution volume (L), and m is the mass of the adsorbent (g). K^0 is the thermodynamic equilibrium constant, and the values of ln K^0 are obtained by plotting ln K_d as a function of C_e and extrapolating C_e to zero. Linear plot of ln $K°$ vs. $1/T$ for the adsorption of BPA on b-CNTs at 293, 303 and 313 K is shown in Fig. S4

The value of the Gibbs free energy change (ΔG^0) was calculated by the following equation

$$\Delta G^0 = -RT \ln K^0 \qquad (2)$$

R is the universal gas constant (8.314 J/mol·K) and T is temperature (K). The changes of enthalpy (ΔH^0) and entropy (ΔS^0) changes can be estimated by Van't Hoff equation:

$$\ln K^0 = -\frac{\Delta H^0}{RT} + \frac{\Delta S^0}{R} \qquad (3)$$

The plot of ln $K°$ vs. $1/T$ gives a straight line in Fig. S4 with slope and intercept corresponding to $-\Delta H^0/R$ and $\Delta S^0/R$, respectively. The calculated thermodynamic parameters are listed in Table 2.