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Supplementary File

Purification of drinking water from dissolved Bisphenol-A (BPA) using zinc oxide nanoparticles

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Table S1: Summarizes the parameters of the three well-known isotherm models employed in this study: Langmuir, Freundlich, and Temkin**.**

Isotherm models	Linear form	Nonlinear form	Parameter	Reference
Freundlich	$\log q_e = \frac{1}{n}\log Ce + \log K_f$	$q_e = K_f \; C_e^{\frac{1}{n}}$	qe adsorption capacity at equilibrium (mg/g) Ce final concentration at equilibrium (mg/l) K_f and n Freundlich constants: K_f (L/g)	**(El-Nahas, Safaa et al., 2020; Koduru et al., 2016)**
Langmuir	$\frac{1}{q_e} = \frac{1}{K_L q_{max}} \frac{1}{C_e} + \frac{1}{q_{max}}$	$q_e = \frac{q_{max} K_L \; C_e}{1 + K_L \; C_e}$	q_{max} Langmuir maximum capacity of adsorption (mg/g) K_L Langmuir constant (L/mg)	
Temkin	$q_e = B\ln A + B\ln C_e$	**$q_e = B(\ln AC_e)$** **$B = R_T/b$**	A is the equilibrium binding constant (L/mg) R is the universal gas constant ($J.mol^{-1}.K^{-1}$), T is temperature K b is the heat of adsorption B is a constant related to the heat of sorption (J/mol.)	

Table S2 : Langmuir dimensionless equilibrium parameter for BPA adsorption onto ZnO NPs at 25 ± 2 °C.

Initial Concentration (mg/L)	R_L values
1.0425	**0.339**
1.9123	**0.218**
2.9241	**0.154**
4.0283	**0.117**
5.0462	**0.096**

Table S3: Kinetic models used in this work

Kinetic models	Equation	Parameter	Reference
Pseudo-first order	$Log(q_e - q_t) = \log q_e - \frac{K_1}{2.303}t$	q_e is the amounts of sorbate at the equilibrium (mg. g^{-1}). q_t is the amounts of sorbate at time (t) (mg. g^{-1}) K_1 (min^{-1}) is the rate constant.	**(El-Nahas, Safaa et al., 2020; El-Nahas, Safaa et al., 2018)**
Pseudo-second order	$\frac{t}{q_t} = \frac{1}{k_2 q_e^2} + \frac{1}{q_e}t$	K_2 (g/mg. min.) is the rate consistent.	
Intraparticle diffusion	$q_t = k_{ad}\, t^{0.5} + C$	K_{ad} is the intraparticle diffusion rate constant (mg. $g^{-1}.min^{0.5}$) C is related to the thickness of boundary layer.	

Table S4 : Thermodynamic parameters.

Thermodynamic parameters	Equation	Reference
Free energy **ΔG° (kJ/mol)**	**$\Delta G° = RT \ln K_C$** **$K_c = C_{ad}/C_e$**	**(Davoud Balarak, June 2019 ; El-Nahas, Safaa et al., 2020)**
Van't Hoff equation	$\ln Kc = \frac{\Delta S°}{R} - \frac{\Delta H°}{RT}$	
Enthalpy (ΔH° kJ/mol) **Entropy (ΔS° kJ/mol K)**	**$\Delta G° = \Delta H° - T\Delta S°$**	

- Where Kc is the thermodynamic equilibrium constant for BPA adsorption onto ZnO NPs, Cs is the equilibrium BPA concentration adsorbed on ZnO NPs at (mg/L) and Ce is the equilibrium BPA concentration in solution (mg/L).

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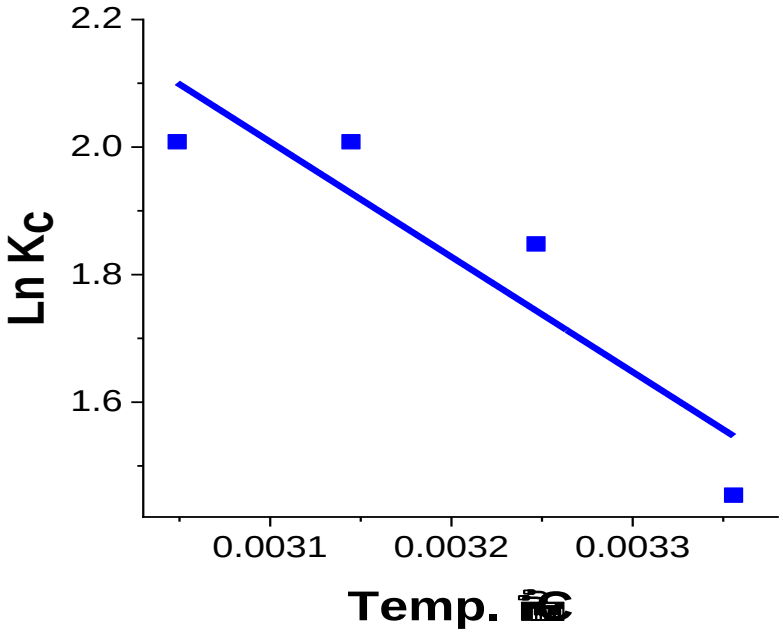

Figure S1: Plot of ln (Kc) versus 1/T for BPA removal by ZnO NPs at 25 ± 2°**C.**