Electronic Supplementary Information

Nanocomposite for Detoxification of Drinking Water: Effective and Efficient Removal of Fluoride and Bactericidal Activity

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Supplementary Data

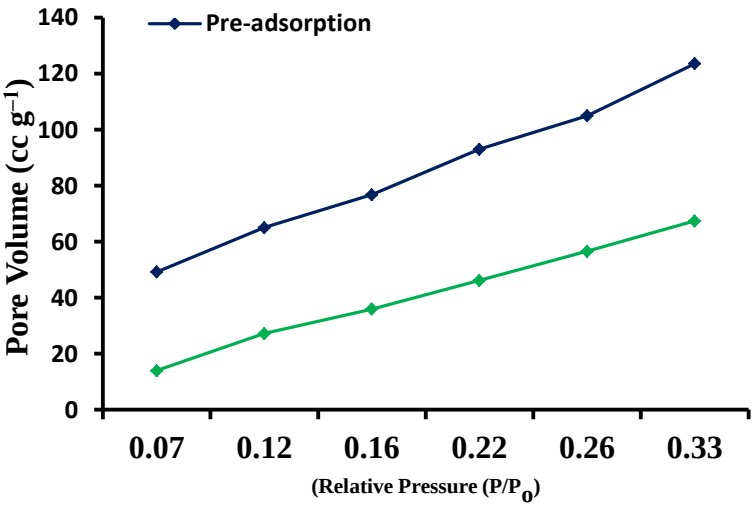

Fig. S1 Effect of adsorption on pore volume.

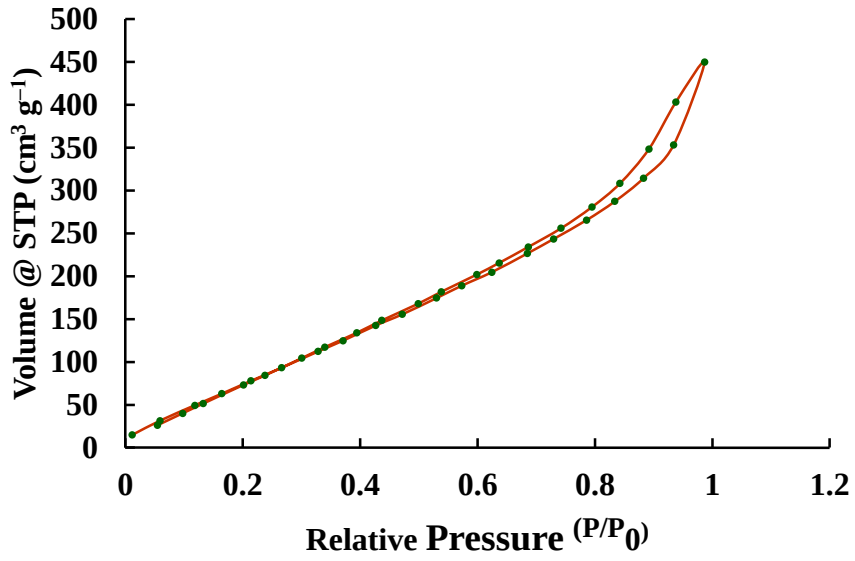

Fig. S2: N_2 adsorption–desorption isotherms.

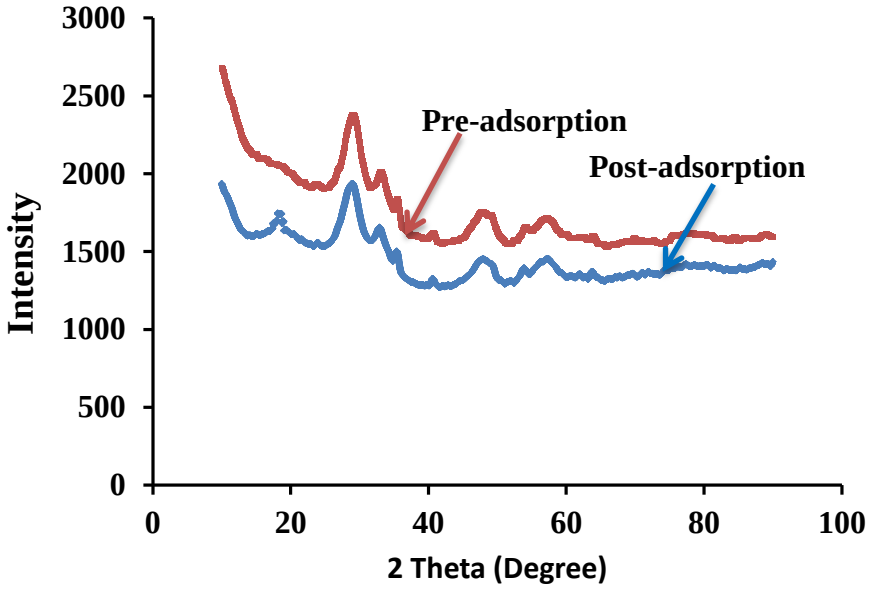

Fig. S3: XRD patterns of adsorbent.

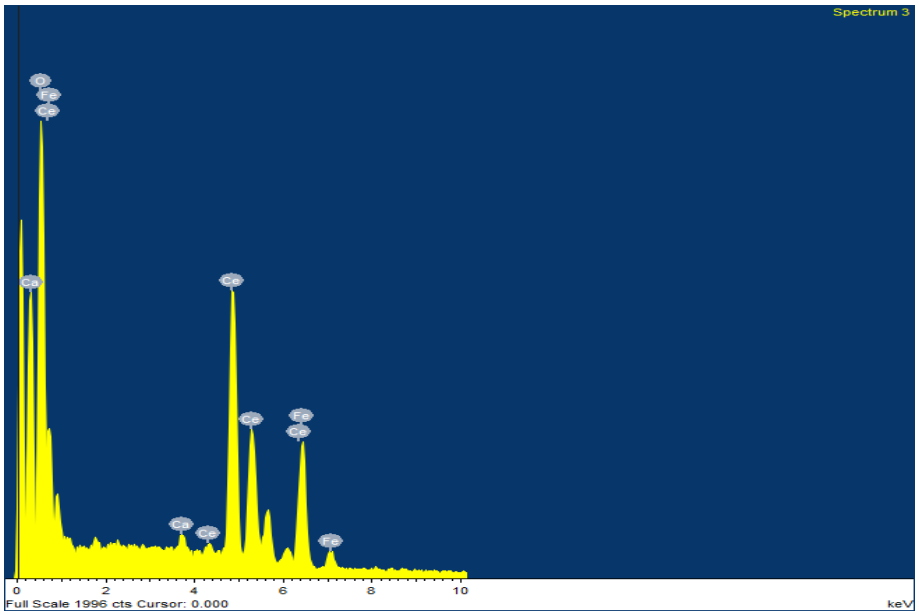

Fig. S4: EDS spectrum of adsorbent (pre–adsorption).

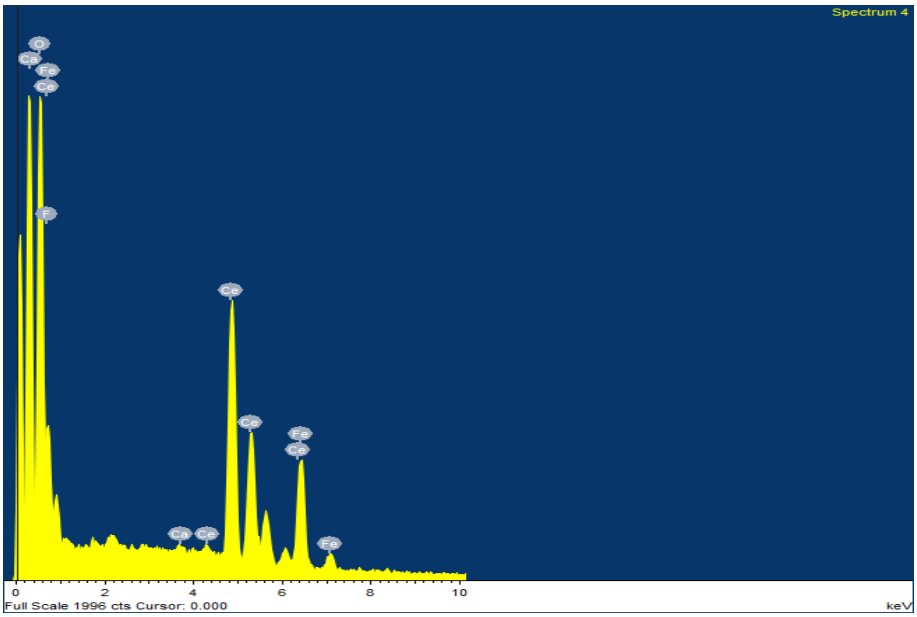

Fig. S5: EDS spectrum of adsorbent (post–adsorption).

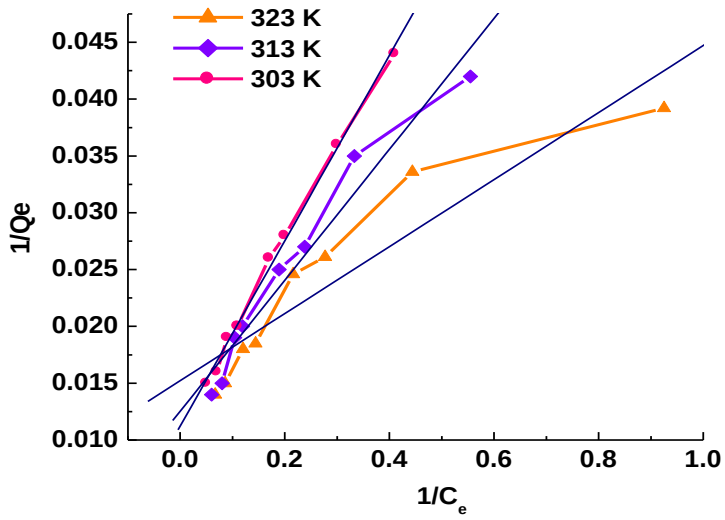

Fig. S6: Langmuir isotherm outlines.

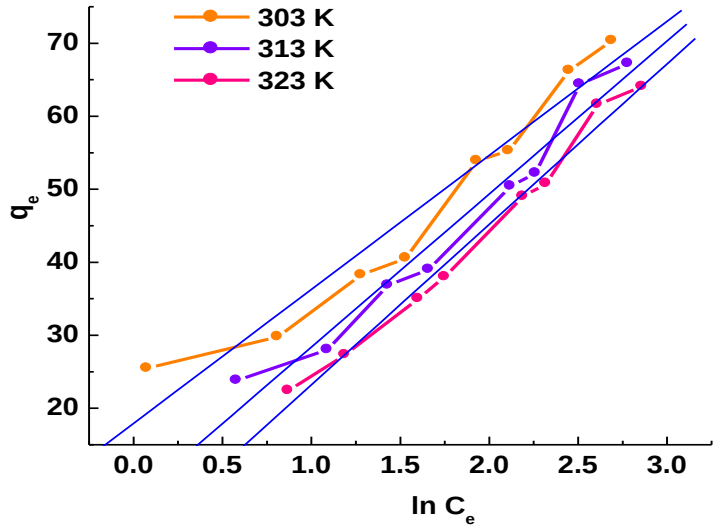

Fig. S7: Temkin isotherm outlines.

Table S1: Isotherm models and their linear forms

Isotherm	Linear form	Plot
Freundlich $q_e = k_F C_e^{1/n}$	$\log q_e = \log k_F + 1/n \times \log C_e$	$\log q_e$ vs $\log C_e$

Langmuir $q_e = Q^0bC_e/1 + bC_e$	$C_e/q_e = (1/Q^0b) + (C_e/Q^0)$	$1/q_e$ vs $1/C_e$
Temkin $q_e = \frac{RT}{b_T}\ln(A_TC_e)$	$q_e = \frac{RT}{b_T}\ln(C_e) + \frac{RT}{b_T}\ln(C_e)$	q_e vs $\ln(C_e)$
D–R $q_e = (q_s)\exp(-K_{ad}\varepsilon^2)$	$\ln(q_e) = \ln(q_s) - (K_{ad}\varepsilon^2)$	$\ln(q_e)$ vs ε^2

Table S2: Langmuir and Temkin isotherm constants at different temperatures

	Langmuir isotherm				Temkin isotherm		
Temperature (K)	K_{ad} (mol^2/kJ^2)	q_s (mg/g)	ε	R^2	b_T (kJ/mol)	A_T (L/g)	R^2
303	–0.0147	4.10	151	0.952	12.21	1.05	0.944
313	–0.0154	4.10	174	0.973	12.41	1.44	0.956
323	–0.0160	4.20	151	0.941	13.72	2.70	0.914

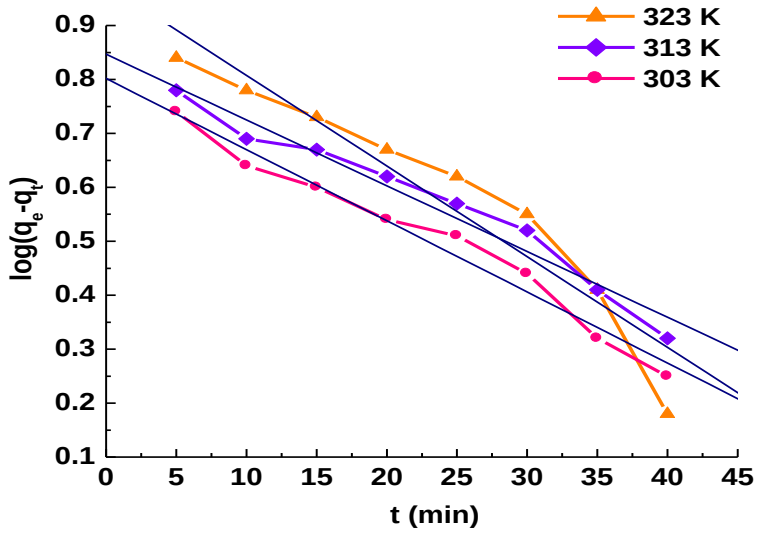

Fig. S8: The pseudo–first–order plots.

Table S3: Kinetic rate constants and correlation coefficients at different temperatures

Pseudo–second–order				Pseudo–first–order			Intra–particle		
Temperature (K)	h	q_e	R^2	k_{ad}	q_e	R^2	q_t	C	R^2
303	0.031	0.025	0.956	0.188	14.5	0.935	0.018	0.075	0.494
313	0.031	0.024	0.972	0.204	15	0.936	0.019	0.076	0.504
323	0.029	0.023	0.982	0.188	16	0.937	0.020	0.078	0.506

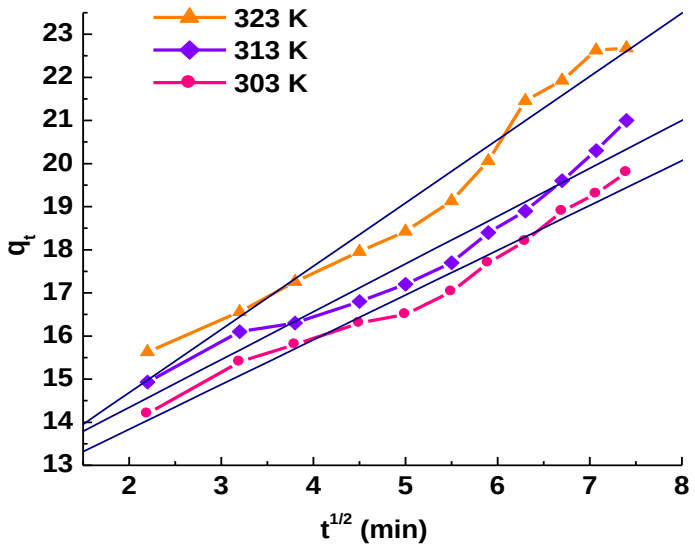

Fig. S9: The intra–particle plots.

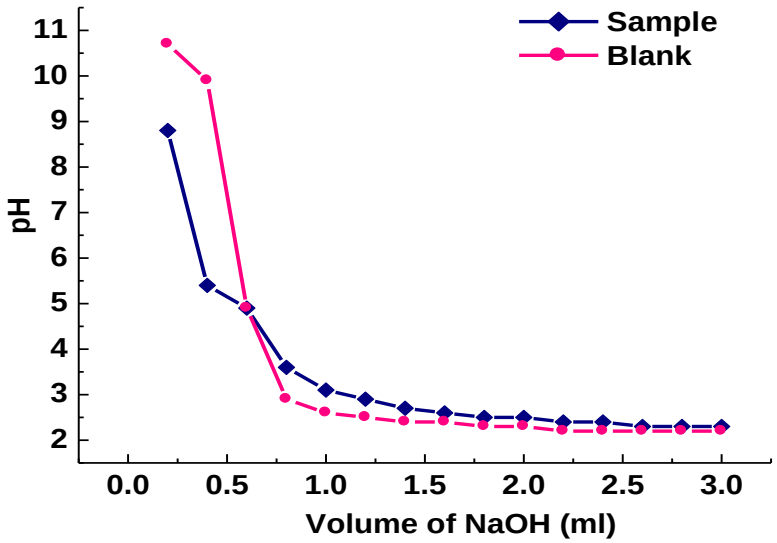

Fig. S10: Potentiometric titration curves.

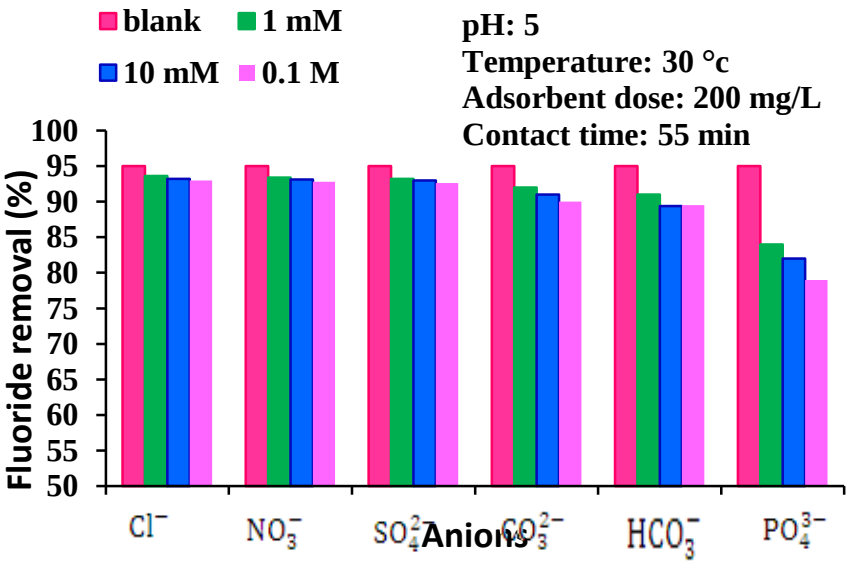

Fig. S11: Effect of co–existing anions.

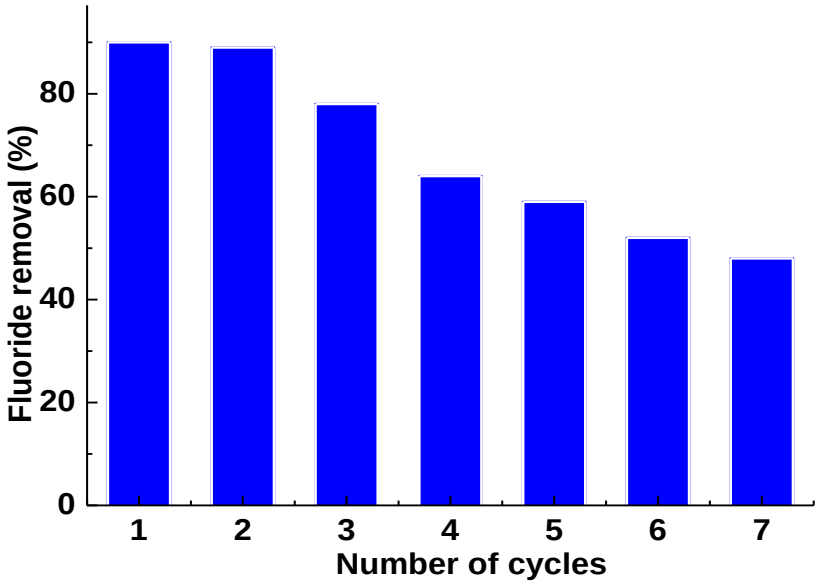

Fig. S12: Relationship between number of cycles and adsorption efficiency.

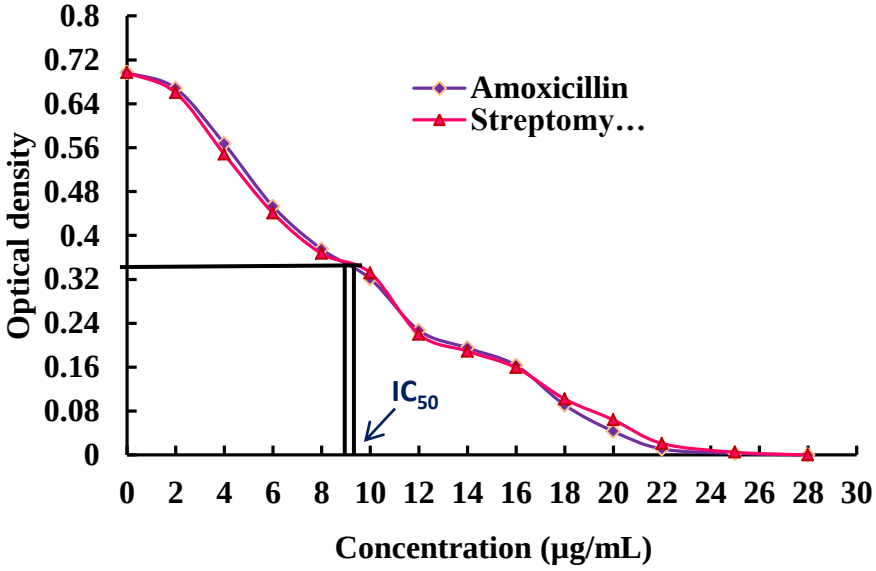

Fig. S13: UV–Visible spectrophotometric calculation of IC_{50} values of standard antibiotics.