Supplementary data

Enhanced adsorption of carbon sphere by doping with titania nanotubes for crystal violet removal: Isotherm, kinetics, and thermodynamic studies

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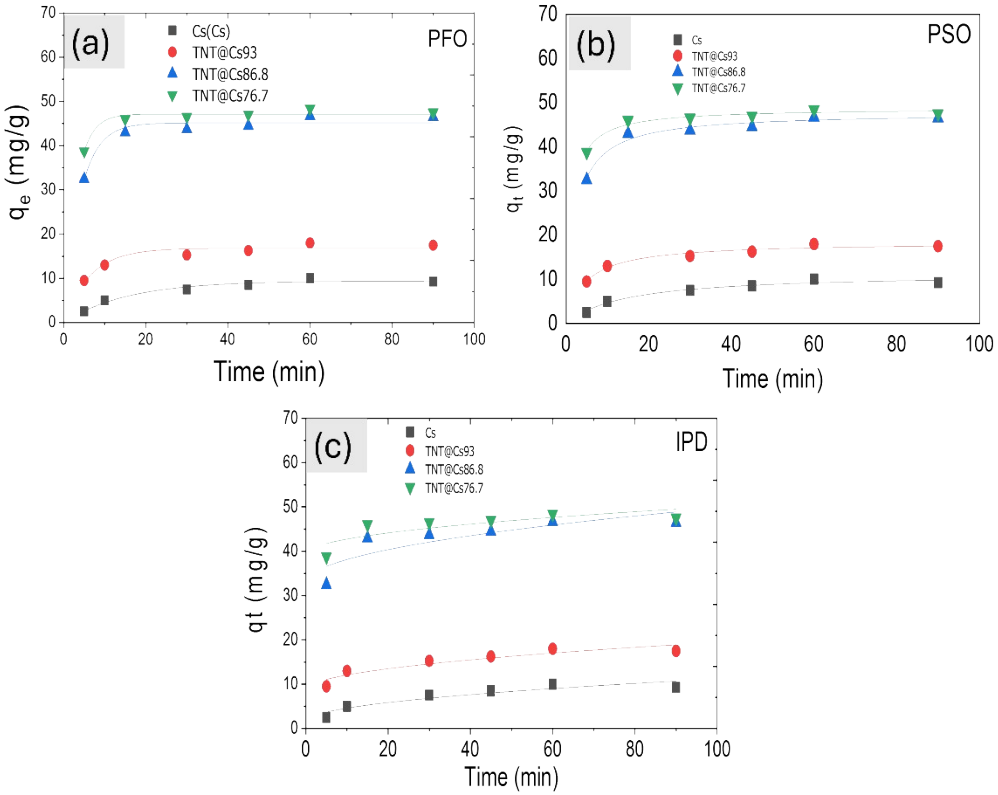

Figure S1: The non-linear kinetics fitting curves for the (a) PFO, (b) PSO, and (c) IPD models.

Table S1: The parameters estimated from the non-linear adsorption kinetic models for the adsorption of CV dye.

Adsorbent	Pseudo first order			Pseudo second order			Intraparticle diffusion		
	$q_{e,cal}$ (mg/g)	K_1 (1/min)	R^2	$q_{e,cal}$ (mg/g)	k_2 (mgg^{-1}/min)	R^2	C (mg/g)	k_p (mgg^{-1}/min)	R^2
Cs	9.42	0.064	0.957	11.38	0.006	0.958	1.52	0.965	0.834
TNTs@Cs$_{93}$	16.82	0.156	0.892	18.42	0.012	0.959	8.65	1.08	0.833
TNTs@Cs$_{86.8}$	45.15	0.250	0.929	47.73	0.009	0.962	32.78	1.70	0.648
TNTs@Cs$_{76.7}$	47.15	0.343	0.941	48.74	0.017	0.957	39.36	1.068	0.557

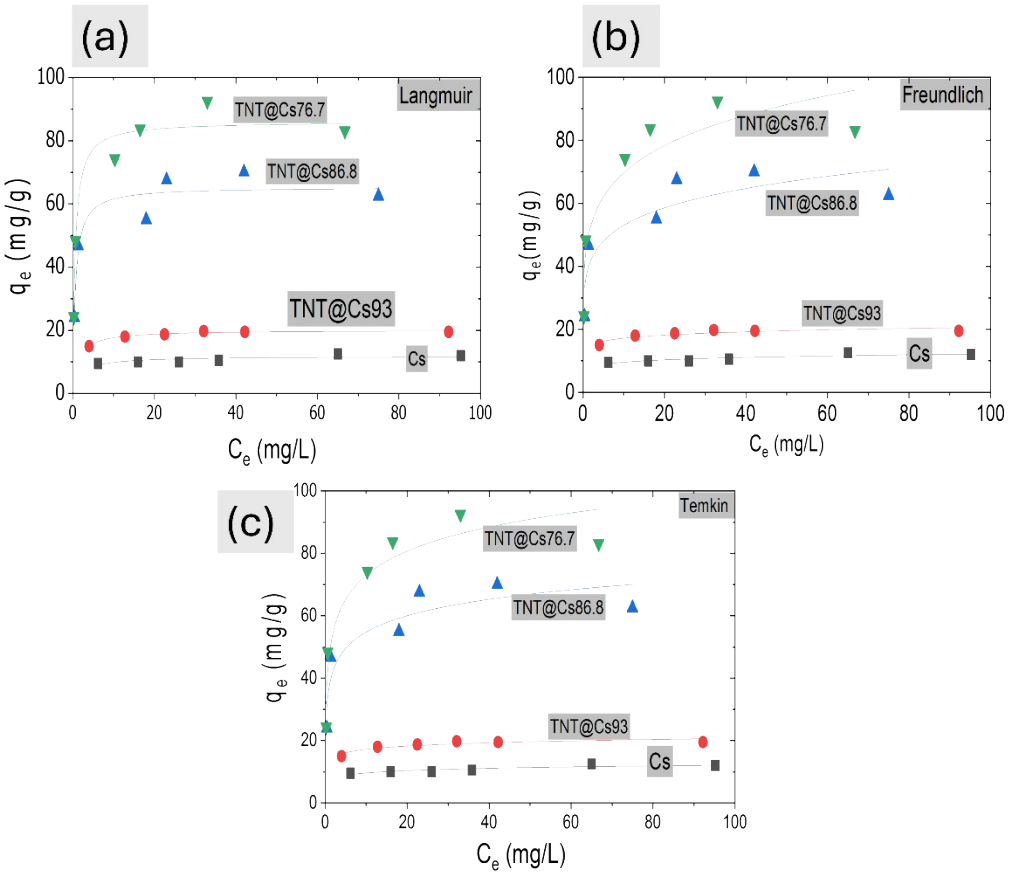

Figure S2: The non-linear isotherm curves for the (a) Langmuir, (b) Freundlich, and (c) Temkin models.

Table S2: The parameters estimated from the non-linear adsorption isotherm models for the adsorption of CV dye.

Adsorbent	Freundlish model			Langmuir model			Temkin model		
	K_f (mg/g)	n	R^2	K_L (L/mg)	q_m (mg/g)	R^2	b_t	A_T (L /g)	R^2
Cs	7.494	9.434	0.757	0.513	11.764	0.449	1.092	652.89	0.732
TNTs@Cs$_{93}$	14.27	12.43	0.750	0.737	20.063	0.971	1.518	8130.14	0.790
TNTs@Cs$_{86.8}$	38.08	6.96	0.746	1.612	65.345	0.892	7.565	139.140	0.805
TNTs@Cs$_{76.7}$	47.32	5.94	0.820	1.773	86.036	0.9513	11.148	69.568	0.897