Supporting Information

Encapsulation of vanadium phosphorus oxide into TiO_2 matrix for selective adsorption of methylene blue from aqueous solution

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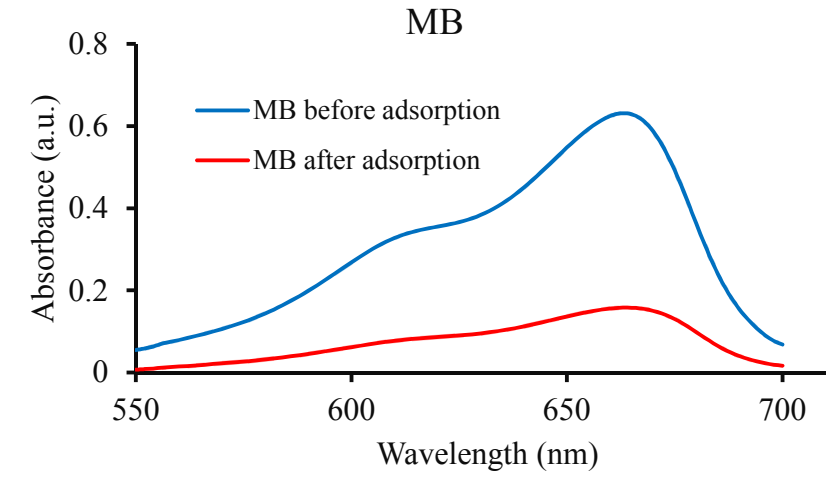

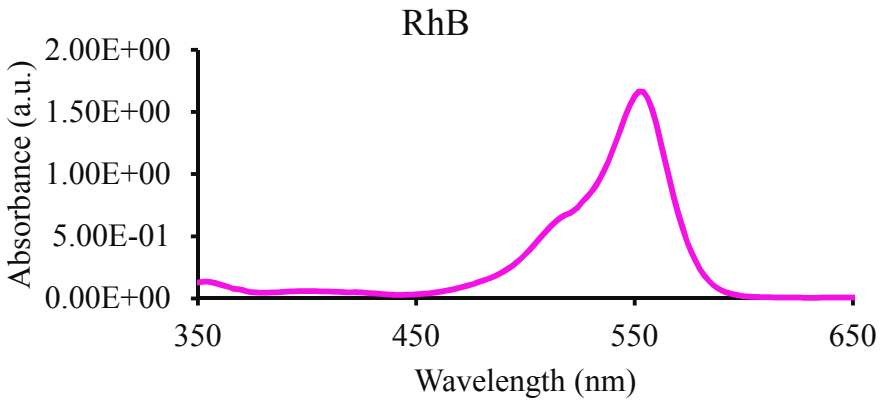

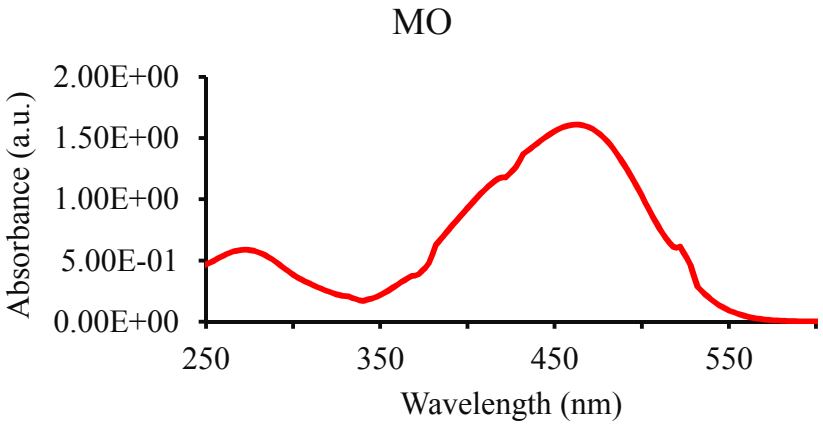

Fig. S1. UV-vis spectra of MB, RhB and MO dyes

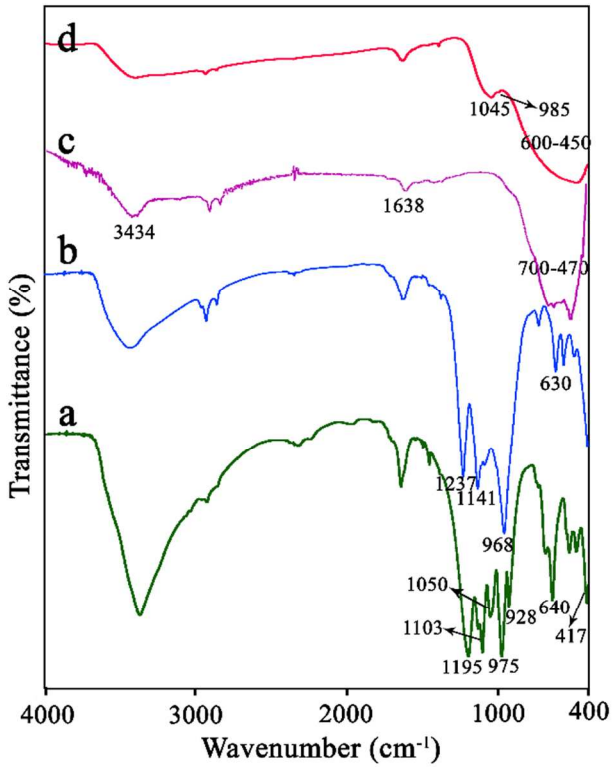

Fig. S2. FTIR spectra of (a) $VOHPO_4.0.5\ H_2O$, (b) VPO, (c) TiO_2 and (d) VPO(30 wt%)@TiO_2

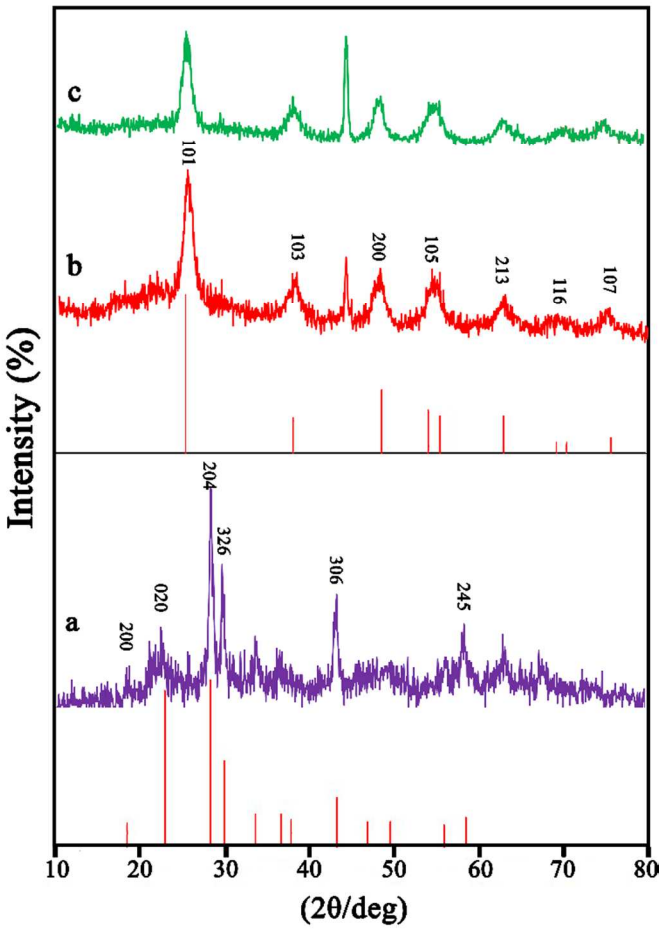

Fig. S3. XRD patterns of (a) VPO and (b) VPO(30 wt%)@TiO_2, and (c) used VPO(30 wt%)@TiO_2 adsorbent after five runs

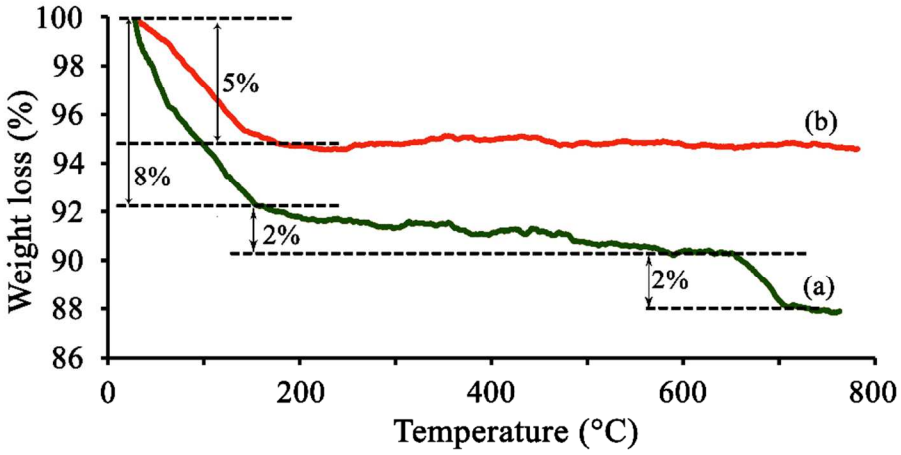

Fig. S4. TGA curves of (a) VPO and (b) VPO(30 wt%)@TiO_2

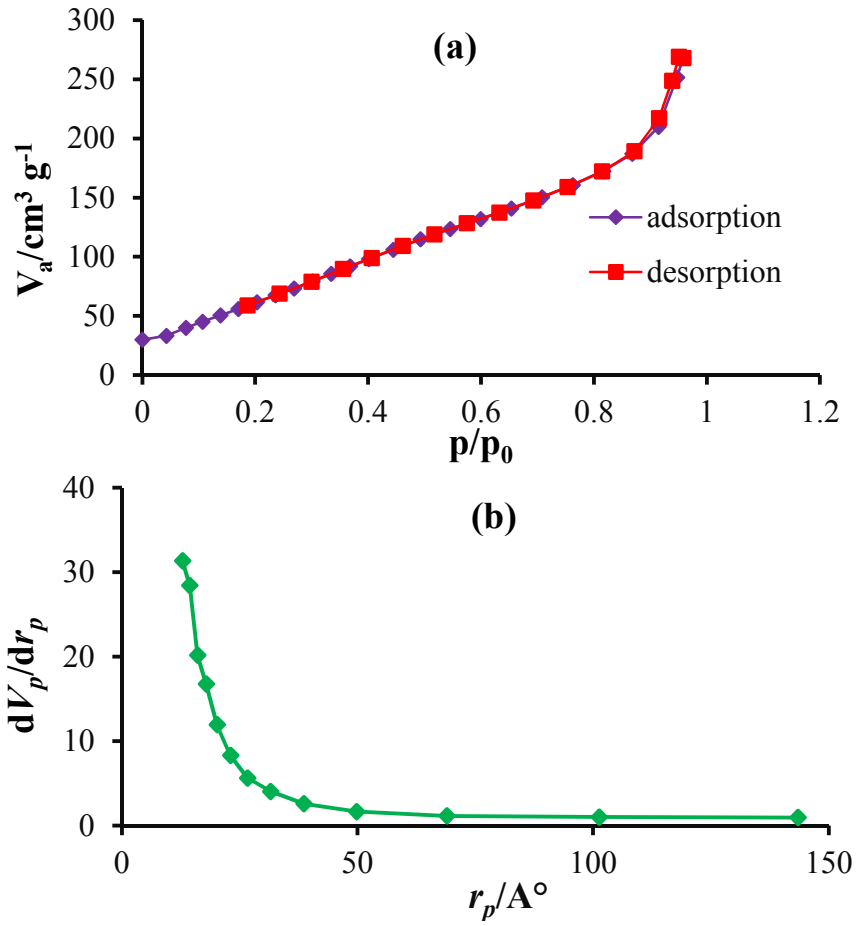

Fig. S5. N_2 adsorption–desorption isotherms (a) and Pore size distribution of VPO(30 wt%)@TiO_2 (b)

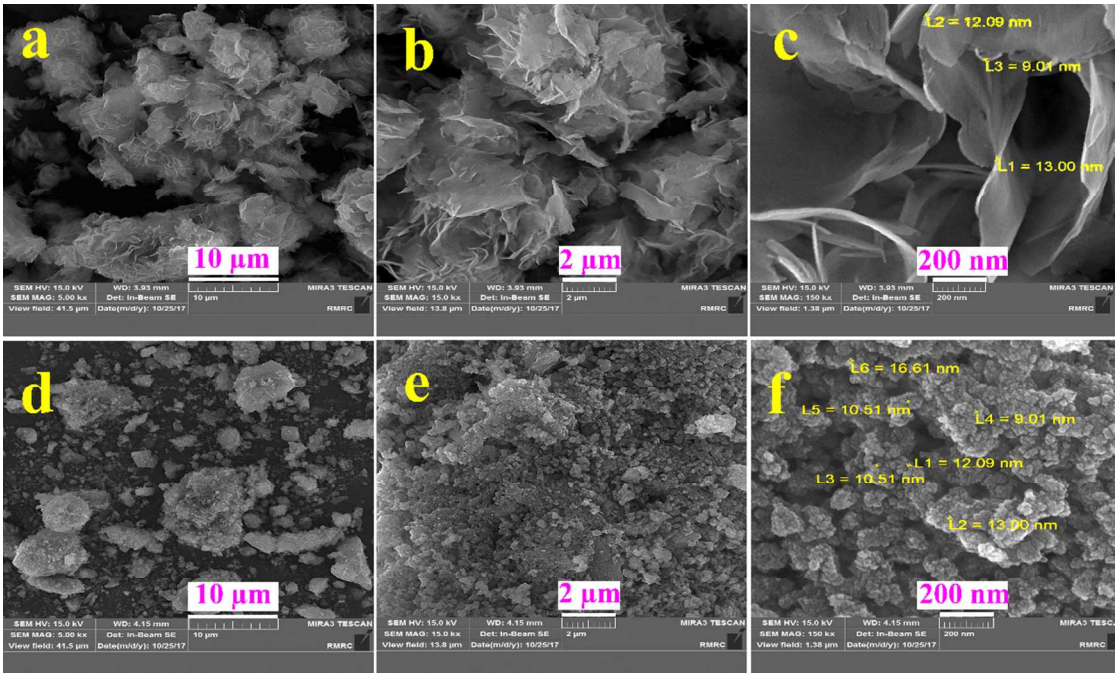

Fig. S6. FESEM images of (a-c) VPO and (d-f) VPO(30 wt%)@TiO_2

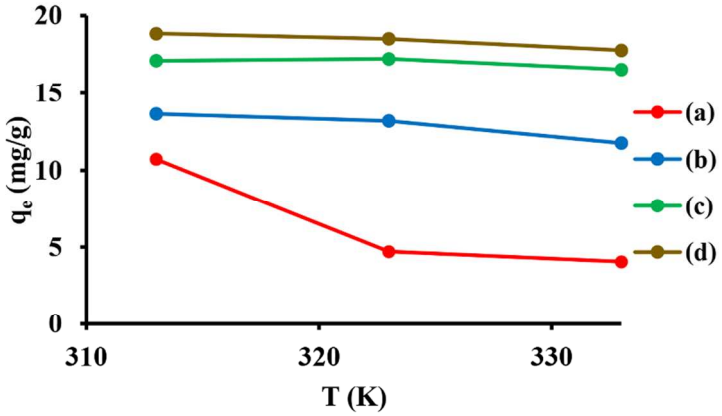

Fig. S7. Effect of temperatures on the adsorption of MB by (a) VPO(5 wt%)@TiO_2, (b) VPO(10 wt%)@TiO_2, (c) VPO(20 wt%)@TiO_2 and (d) VPO(30 wt%)@TiO_2

Adsorption conditions: C_0 = 20 mg/L, adsorbent dosage = 10 mg, pH = 6.0, adsorption time = 24 h.

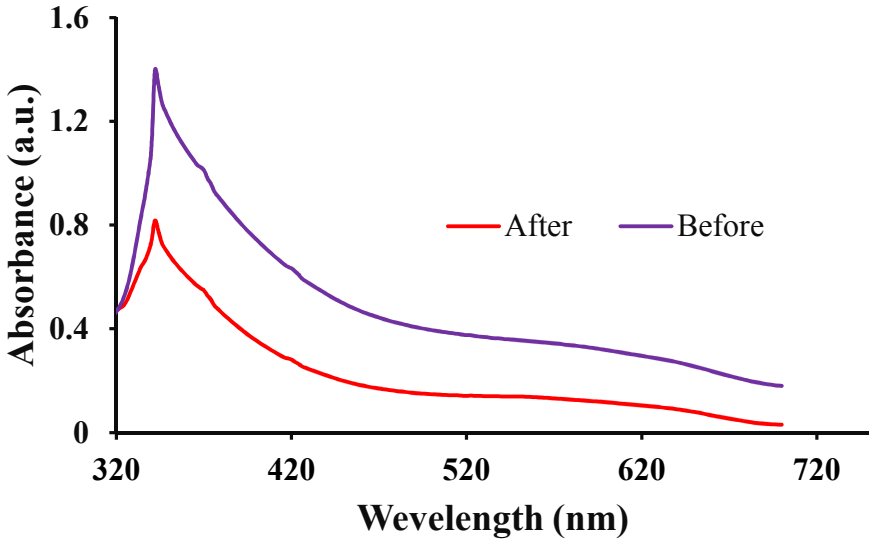

Fig. S8. UV−vis absorption spectrum of real water sample

Adsorption conditions: adsorbent dosage = 10 mg, adsorption time = 24 h at room temperature.

Table S1. Langmuir, Freundlich, and Redlich−Peterson isotherm parameters for MB adsorption on TiO_2 and VPO(5, 10 and 20 wt%)@TiO_2

Isotherm	Parameter	TiO_2	VPO(5 wt%)@TiO_2	VPO(10 wt%)@TiO_2	VPO(20 wt%)@TiO_2
Langmuir	K_L	0.0243	0.0265	0.0374	0.2071
	R_L	0.6729	0.507	0.4006	0.1077
	Q_0	14.7710	18.5873	37.5939	44.0528
	R^2	0.9308	0.7117	0.9206	0.9914
Freundlich	K_F	0.7680	0.2299	2.7258	12.4623
	$1/n_F$	0.5860	0.917	0.5551	0.3149
	R^2	0.9606	0.9602	0.9773	0.9103
Redlich−Peterson	K_R	0.004	0.004	0.004	0.004
	a_R	0.0018	0.0006	0.0007	0.0001
	g	0.4104	0.7004	0.9065	0.5475
	R^2	0.9006	0.8797	0.798	0.9042

K_F ((mg/g)(L/mg)$^{1/n}$); K_L (L/mg); Q_0 (mg/g); K_R *(L/g)*; a_R *(mg^{-1})*
Adsorption conditions: C_0 = 40 mg/L, adsorbent dosage = 10 mg, pH = 7.0, adsorption time = 24 hat room temperature.