Supporting information

Graphene oxide nanocomposite hydrogel based on poly(acrylic acid) grafted onto salep: adsorbent for the removal of noxious dyes from water

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Table S1. The calculated kinetic parameters for the absorption of MV onto GONH

Kinetic models	Parameters	25 ℃	30 ℃	35 ℃	40 ℃	45 ℃
Pseudo-first order	q_e	1.065	1.012	1.056	1.05	1.151
	K_1	0.067	0.0789	0.0697	0.0732	0.0757
	R^2	0.4551	0.5475	0.5425	0.5672	0.5778
Pseudo-second order	q_e	256.41	254.336	258.526	259.263	261.294
	K_2	0.025	0.029	0.028	0.0281	0.0277
	R^2	0.9875	0.9907	0.991	0.9924	0.9932

Table S2. The calculated isotherm parameters for the absorption of MV onto GONH

Isotherms models	Parameters	
Langmuir	q_m	348.82
	K_L	0.011
	R^2	0.9991
Freundlich	n	3.913
	K_f	3.885
	R^2	0.9134

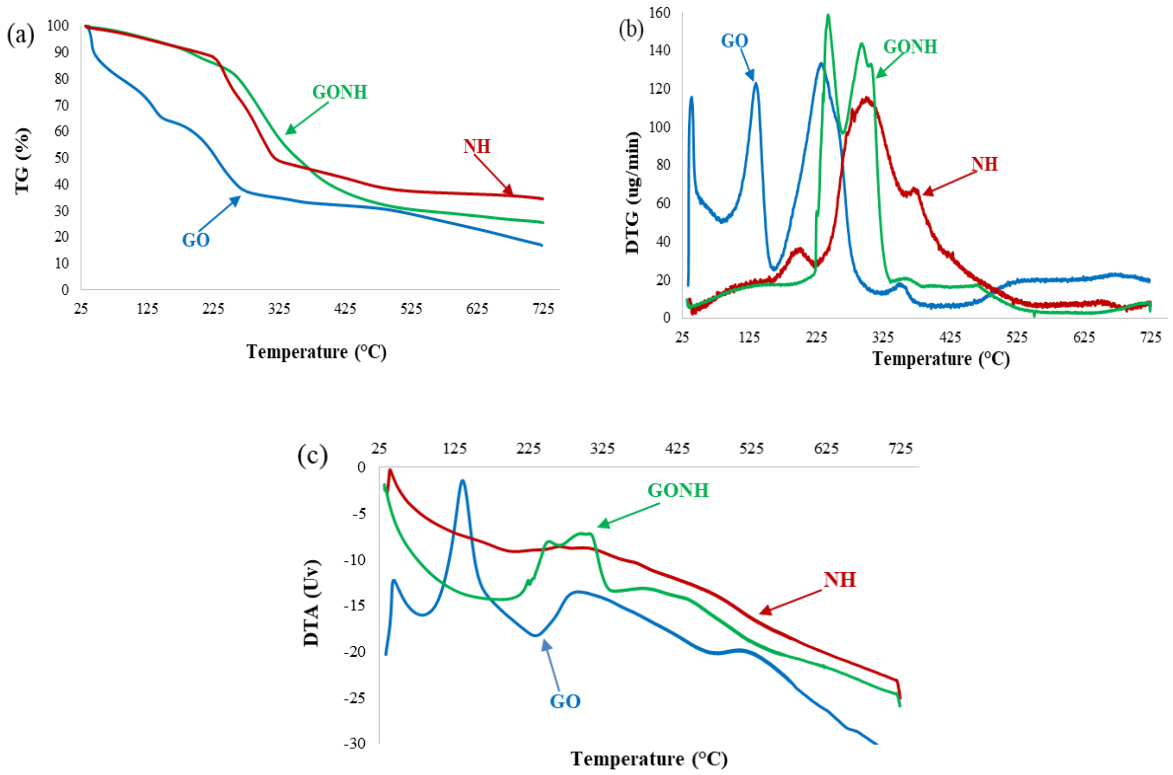

Fig.S1 (a) TGA, (b) DTG, and (c) DTA curves of GO, NH and GONH at 20 °C/min under nitrogen atmosphere (flow rate 25 mL/min)

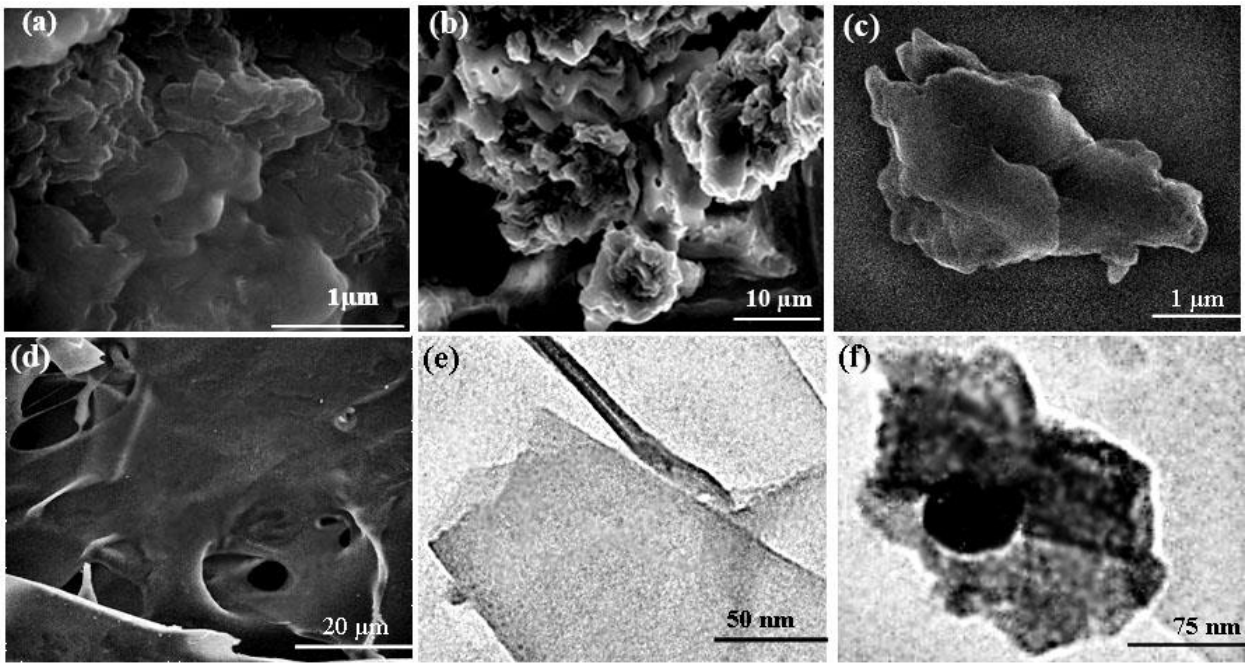

Fig.S2 (a) and (b) SEM image of GONH, (c) SEM image of GO, (d) SEM image of NH, (e) TEM image of GO, and (f) TEM image of GONH

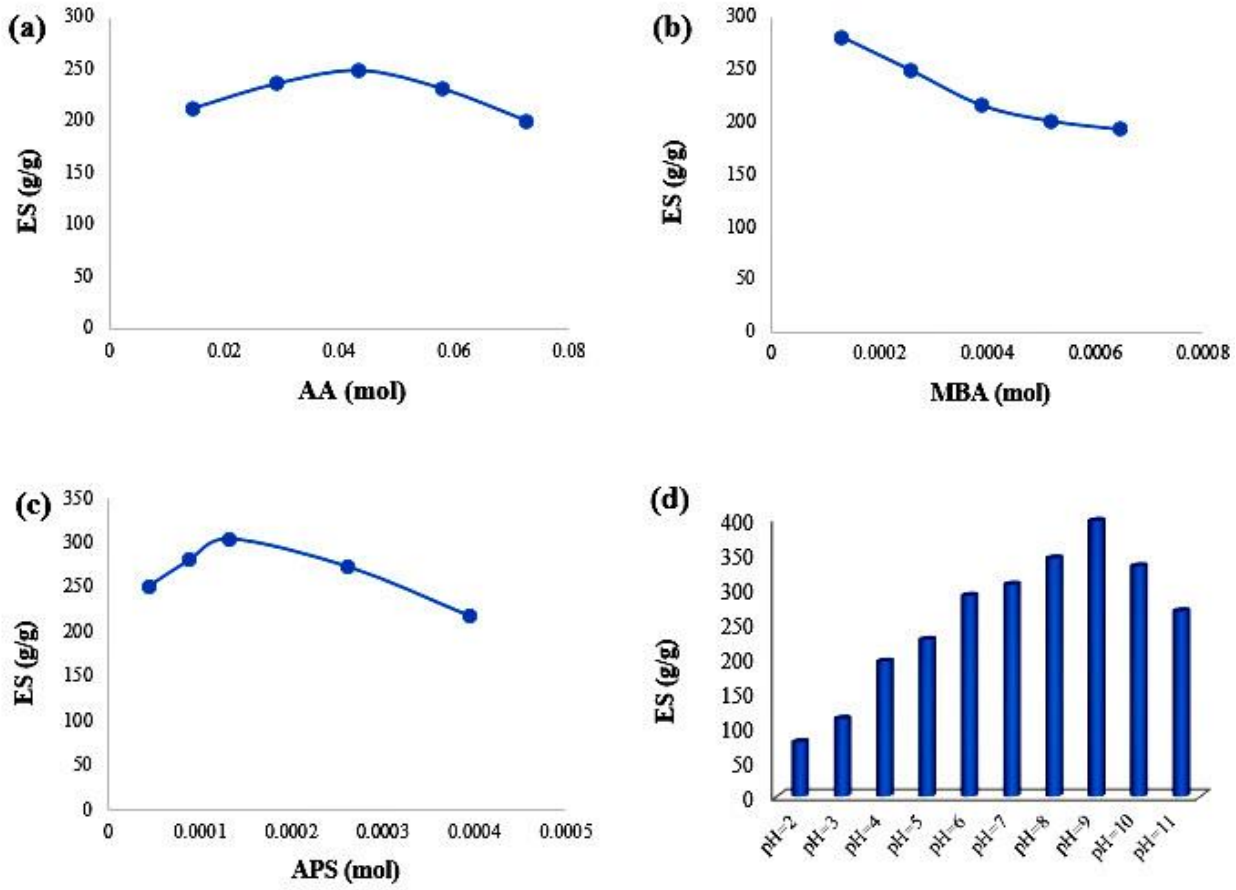

Fig. S3 (a) Effect of the AA monomer amount on equilibrium swelling capacity of the GONH (reaction conditions: salep weight: 1.0 g, MBA: 2.594×10^{-4} mol and APS: 8.764×10^{-5} mol), **(b)** Effect of the MBA crosslinker amount on equilibrium swelling capacity of the GONH (reaction conditions: salep weight: 1.0 g, AA: 4.363×10^{-2} mol and APS: 8.764×10^{-5} mol), **(c)** Effect of the APS initiator amount on equilibrium swelling capacity of the GONH (reaction conditions: salep weight: 1.0 g, AA: 4.363×10^{-2} mol and MBA: 1.297×10^{-4} mol), and **(d)** Swelling dependency of the optimized GONH on pH

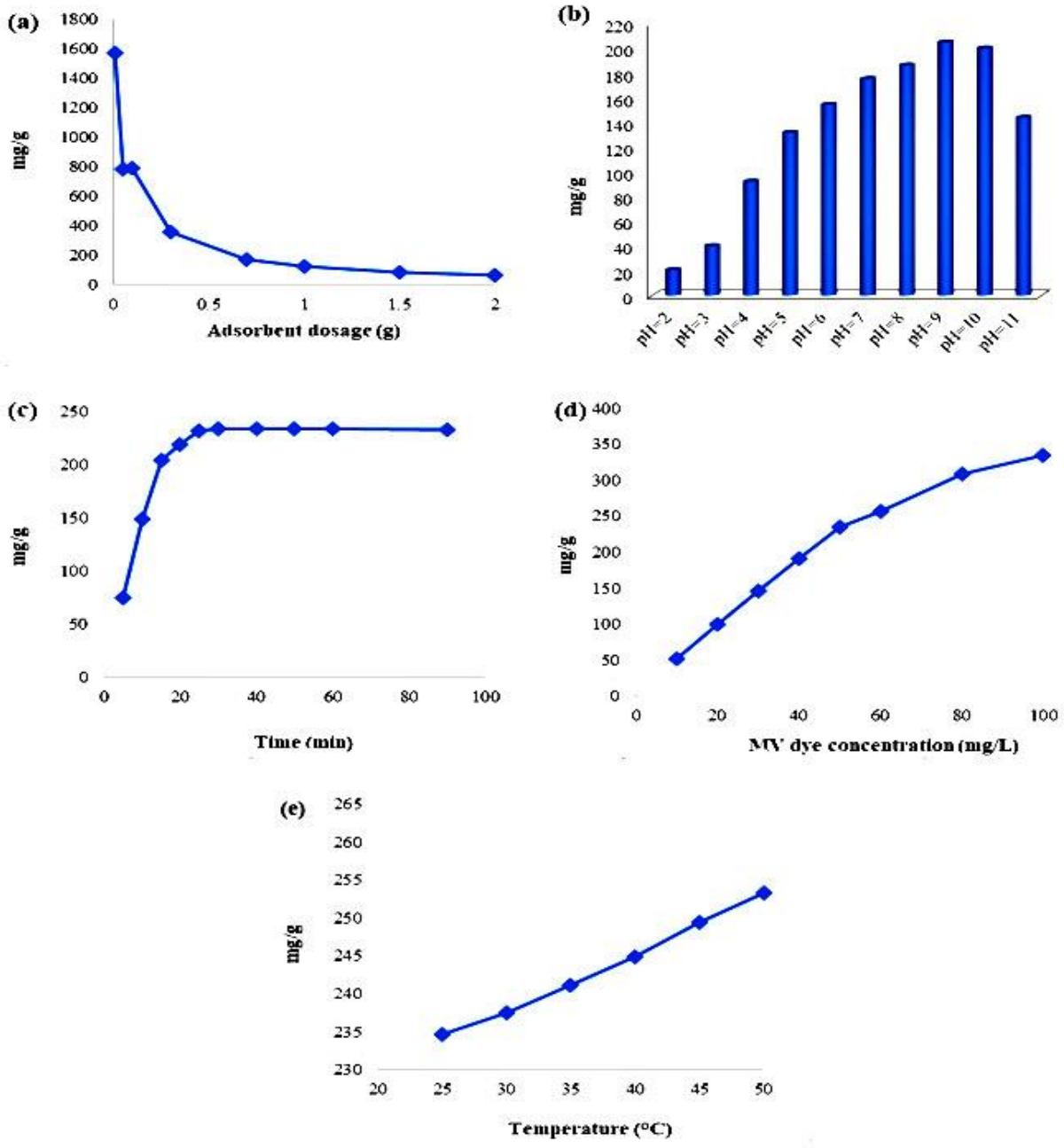

Fig. S4 (a) Effect of adsorbent dosage on adsorption capacity of MV dye (reaction conditions: pH solution: 7, contact time: 15 min, MV dye concentration: 50 mg/L, and temperature solution: 25 ºC), (b) Effect of initial solution pH on adsorption capacity of MV dye (reaction conditions: GONH weight: 0.7 g, contact time: 15 min, MV dye concentration: 50 mg/L and temperature solution: 25 ºC), (c) Effect of contact time on adsorption capacity of MV dye .(reaction conditions: GONH weight: 0.7 g, pH solution: 7, MV dye concentration: 50 mg/L, and temperature solution: 25 ºC), (d) Effect of initial dye concentration on adsorption capacity of MV dye (reaction conditions: GONH weight: 0.7 g, pH solution: 7, contact time: 30 min, and temperature solution: 25 ºC), and (e**)** Effect of temperature on adsorption capacity of MV dye (reaction conditions: GONH weight: 0.7 g, pH of solution: 7, contact time: 30 min, and MV dye concentration: 50 mg/L)

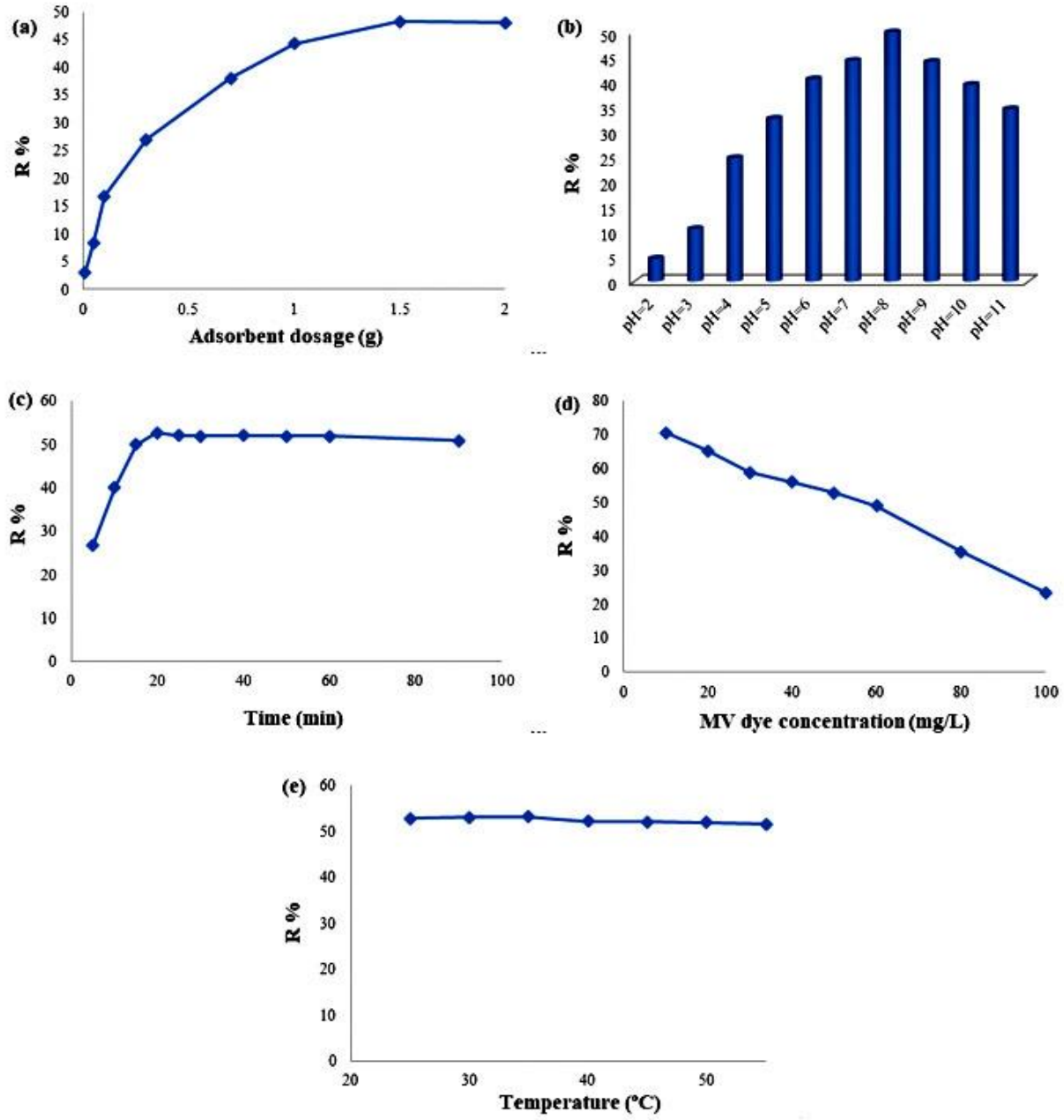

Fig. S5. (a) Effect of adsorbent dosage (GO) on removal percentage of MV dye (reaction conditions: pH solution: 7, contact time: 15 min, MV dye concentration: 50 mg/L, and temperature solution: 25 ºC), (b) Effect of initial solution pH on removal percentage of MV dye (reaction conditions: GO weight: 1 g, contact time: 15 min, MV dye concentration: 50 mg/L and temperature solution: 25 ºC), (c) Effect of contact time on removal percentage of MV dye .(reaction conditions: GO weight: 1 g, pH solution: 8, MV dye concentration: 50 mg/L, and temperature solution: 25 ºC), (d) Effect of initial dye concentration on removal percentage of MV dye (reaction conditions: GO weight: 1 g, pH solution: 8, contact time: 20 min, and temperature solution: 25 ºC), and (e) Effect of temperature on removal percentage of MV dye (reaction conditions: GO weight: 1 g, pH of solution: 8, contact time: 20 min, and MV dye concentration: 50 mg/L)