Supporting Information(SI)

Fast adsorption of methylene blue, basic fuchsin, and malachite green by a novel sulfonic-grafted triptycene-based porous organic polymer

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Fig. S1

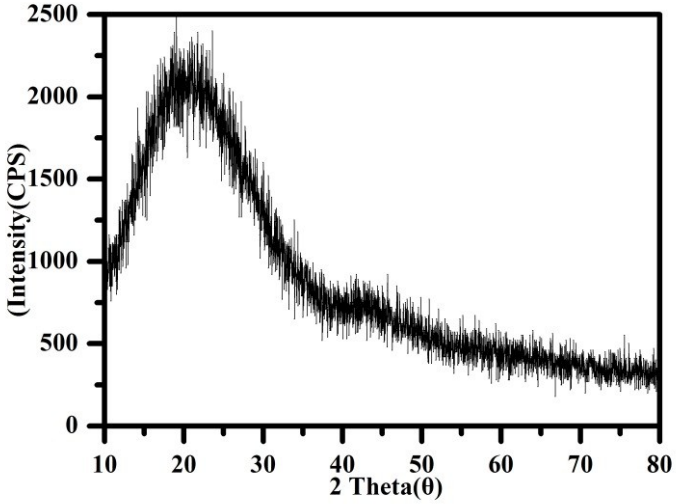

Fig. S1 XRD of TPP-SO_3H

Fig. S2

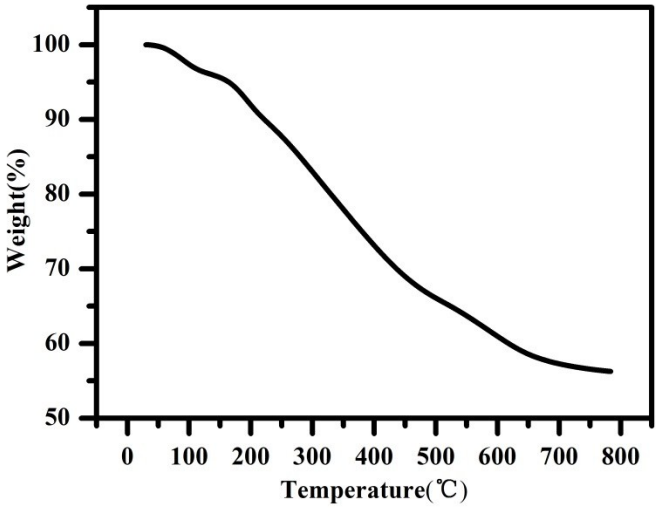

Fig. S2 TGA of TPP-SO_3H

Fig. S3

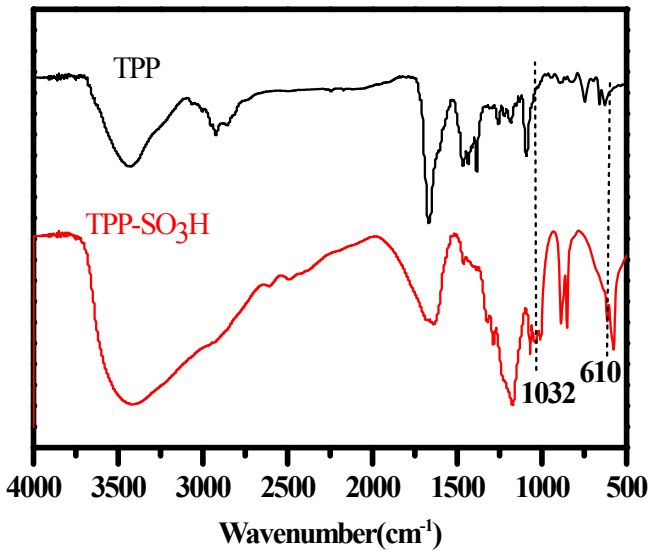

Fig. S3 FT-IR spectra of TPP (Black), TPP-SO_3H (red)

Fig. S4

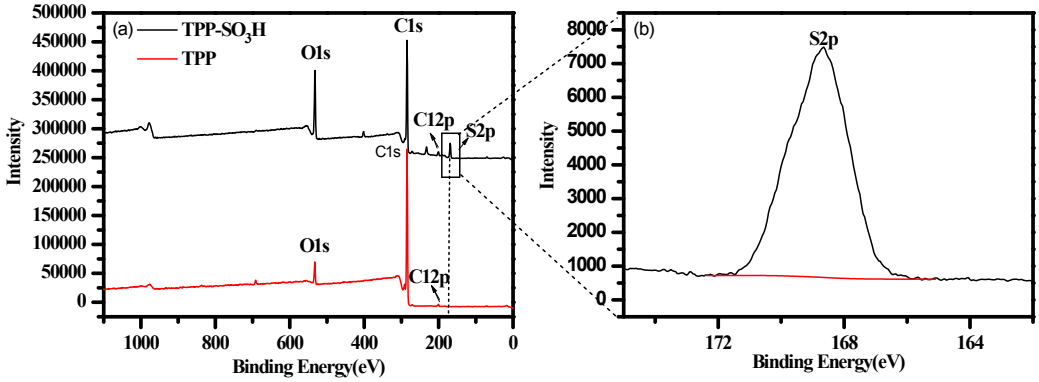

Fig. S4 XPS survey spectra of (a) TPP and TPP-SO_3H; (b) S2p spectra of TPP-SO_3H

Fig. S5

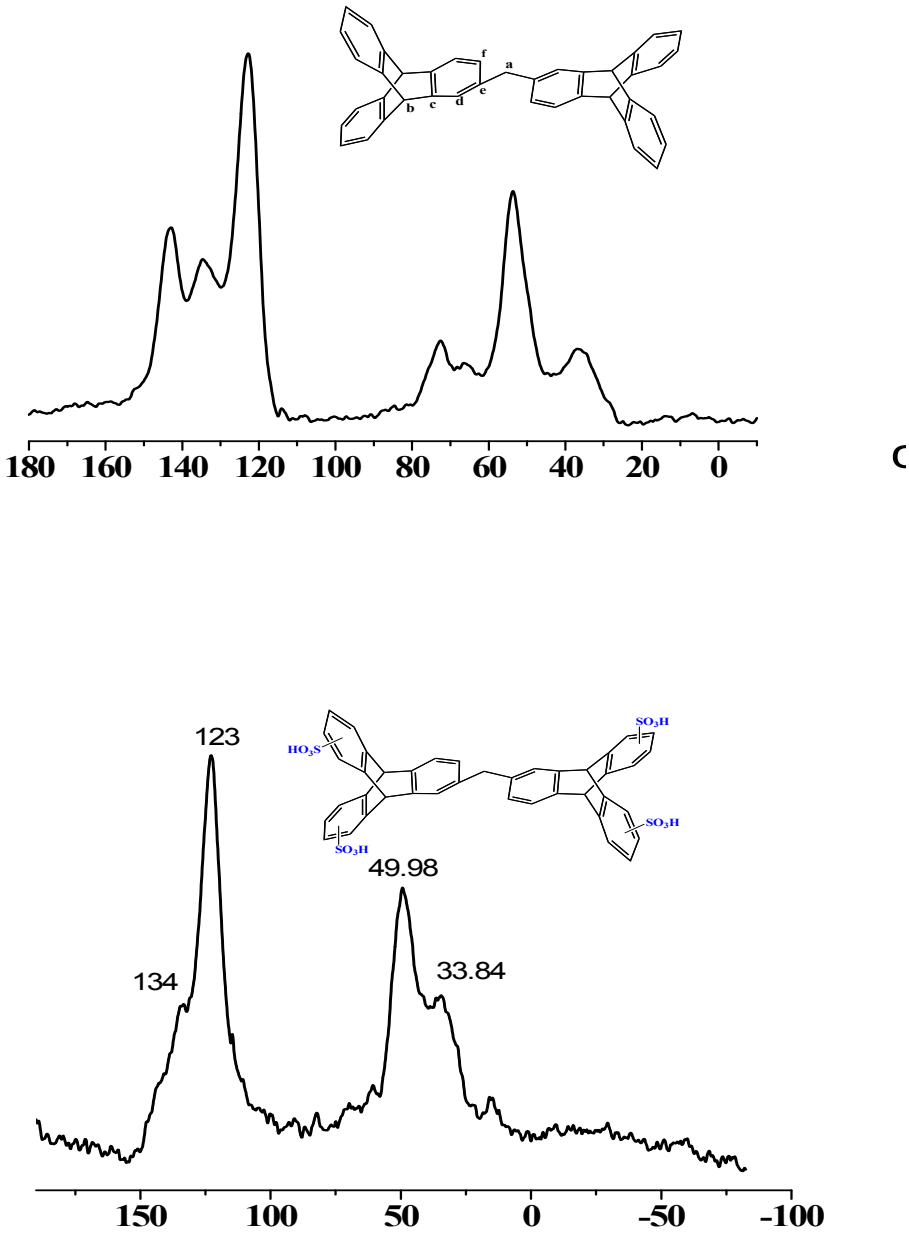

Fig. S5 ^{13}C CP/MAS NMR spectrum of TPP and TPP-SO_3H

Fig. S6

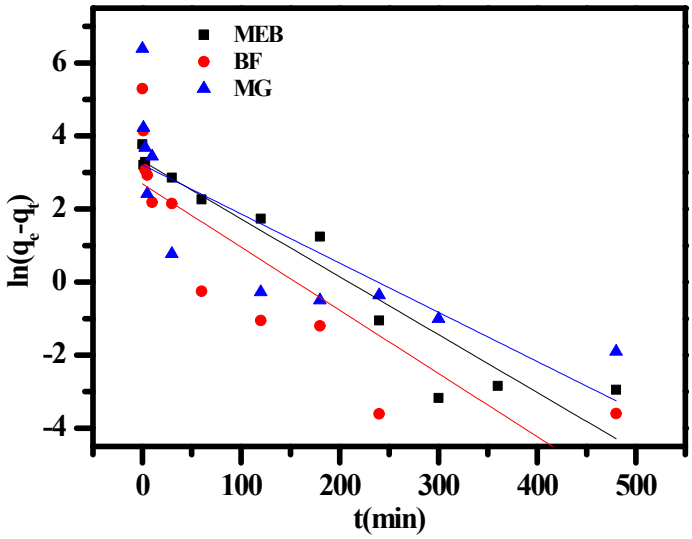

Fig. S6 The plots of the pseudo-first-order kinetics for the adsorption of MEB, BF and MG.

Fig. S7

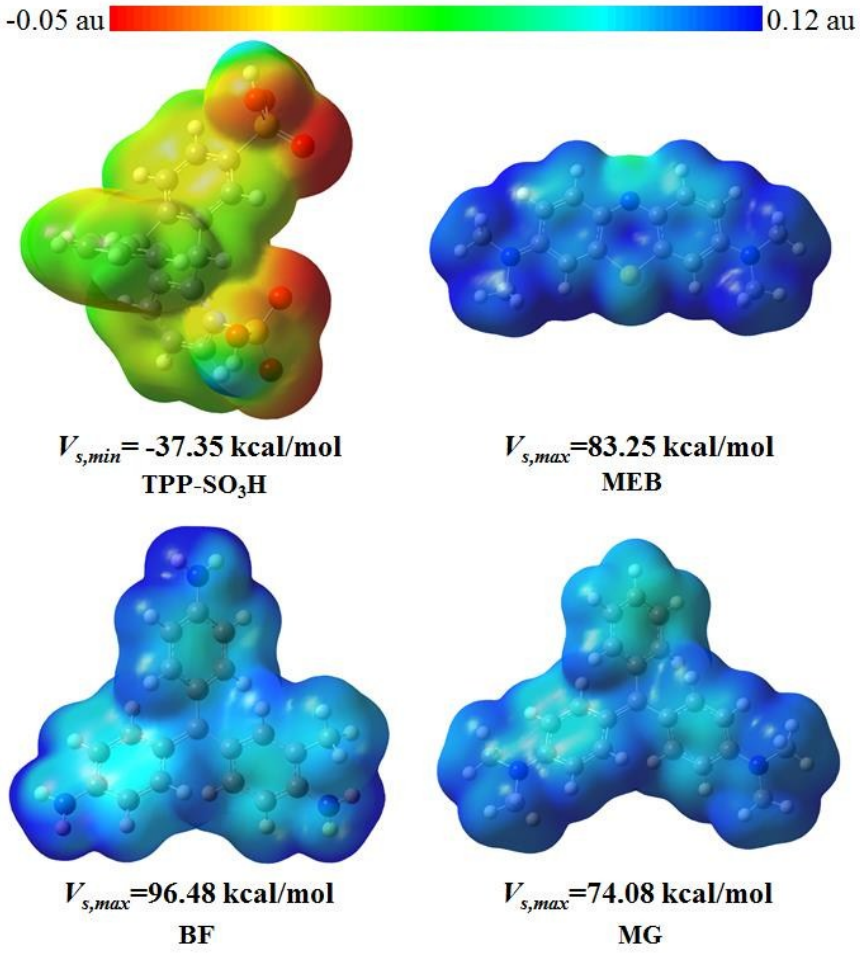

Fig. S7 The ESP surfaces of TPP-SO_3H and dyes MEB, BF and MG

It is well-known that in the diagrams of ESP surfaces, red represents negative ESP which has an ability to absorb cations. On the contrary, blue means positive ESP to absorb anions.

Fig. S8

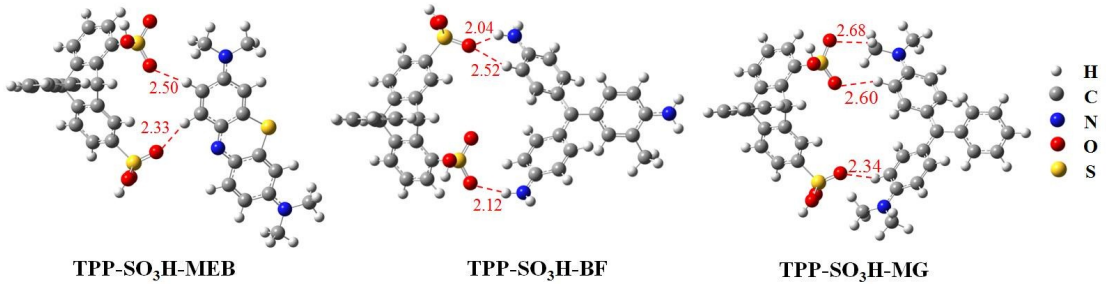

Fig. S8 Optimized structures for the complexes (unit is Å)

Fig. S9

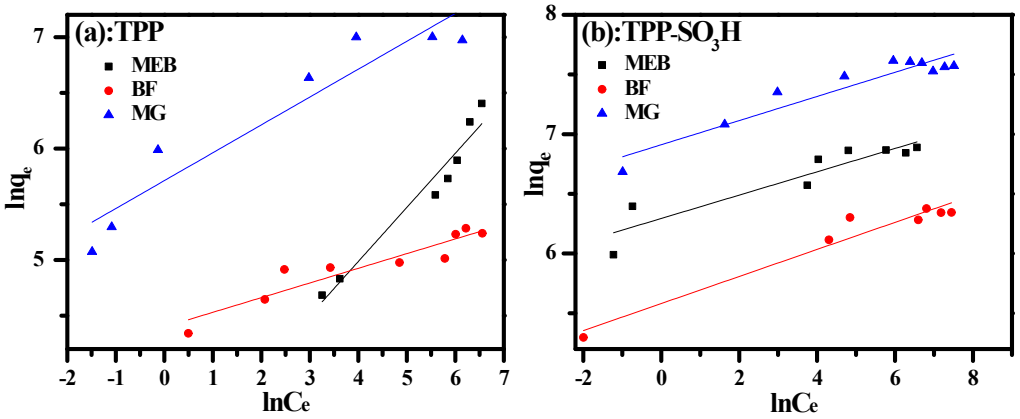

Fig. S9 Adsorption isotherms of MEB, BF and MG on TPP and TPP-SO_3H based on Freundlich isotherm model

Table S1

Table S1 The porosity properties of TPP-SO_3H

Polymer	SA_{BET}[a]($m^2 \cdot g^{-1}$)	V_t[b]($cm^3 \cdot g^{-1}$)	V_m[c]($cm^3 \cdot g^{-1}$)	% V_m/V_t
TTP-SO_3H	573.3	0.3084	0.2299	70.5
TTP	1220.1	0.9633	0.1941	20.2

a: surface area calculated by the BET equation; b: pore volume at p/p_0 = 0.99; c: micropore volume obtained by t-plot.

Table S2

Table S2 Comparison of MEB, BF and MG equilibrium rate constants among different adsorbents

Adsorbents	equilibrium rate constants K_2 (g·mg^{-1}·min^{-1})			Ref.
	MEB	BF	MG	
CMt	1×10^{-3}	/	/	1
porous carbon	4.6×10^{-4}	/	/	2
MIL-100-SO_3H	4.11×10^{-4}	/	3.25×10^{-4}	3
calcium alginate membrane	9.515×10^{-5}	/	/	4
Fe_3O_4@ AMCA-MIL-53(Al)	7.5×10^{-4}	/	1.4×10^{-3}	5
TSF-HMMS	2×10^{-3}	/	/	6
bottom ash	/	9.79×10^{-4}	/	7
TPP-SO_3H	2.6×10^{-3}	1.49×10^{-2}	9.3×10^{-3}	This work

Table S3

Table S3 Adsorption kinetic model parameters for MEB , BF, and MG

Dyes	q_{eq}(exp) (mg·g^{-1})	Pseudo-first-order kinetic model			Pseudo-second-order kinetic model		
		q_e(cal) (mg·g^{-1})	K_1(min^{-1})	R^2	q_e(cal) (mg·g^{-1})	K_2(g·mg^{-1}·min^{-1})	R^2
MEB	199.44	27.47	0.0158	0.907	199.60	0.0026	0.997
BF	198.36	24.84	0.0173	0.698	198.02	0.0149	0.999
MG	596.77	14.71	0.0135	0.628	591.72	0.0093	0.999

Table S4

Table S4 The parameters of the adsorption isotherms of MEB, BF, and MG on TPP-SO_3H and TPP based on Langmuir and Freundlich isotherm model

	Dyes	q_{eq}(exp) (mg·g^{-1})	Langmuir model			Freundlich model		
			q_{eq}(cal) (mg·g^{-1})	K_L(g·mg^{-1})	R^2	$1/n_F$	K_F(mg·g^{-1})	R^2
TPP	MEB	177.99	178.89	0.079	0.998	0.485	20.994	0.946
	BF	197.01	196.08	0.103	0.997	0.132	81.280	0.861
	MG	1077.04	1079.42	0.515	0.999	0.250	302.348	0.887
TPP-SO_3H	MEB	981.81	983.43	0.308	0.999	0.070	626.714	0.840
	BF	586.16	588.24	0.224	0.999	0.113	265.316	0.937
	MG	1942.50	1947.02	0.162	0.999	0.101	1003.702	0.887

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