Electronic Supplementary Information

Ordered cubic mesoporous silicas KIT-5 functionalized with carboxylic acid groups for dye removal

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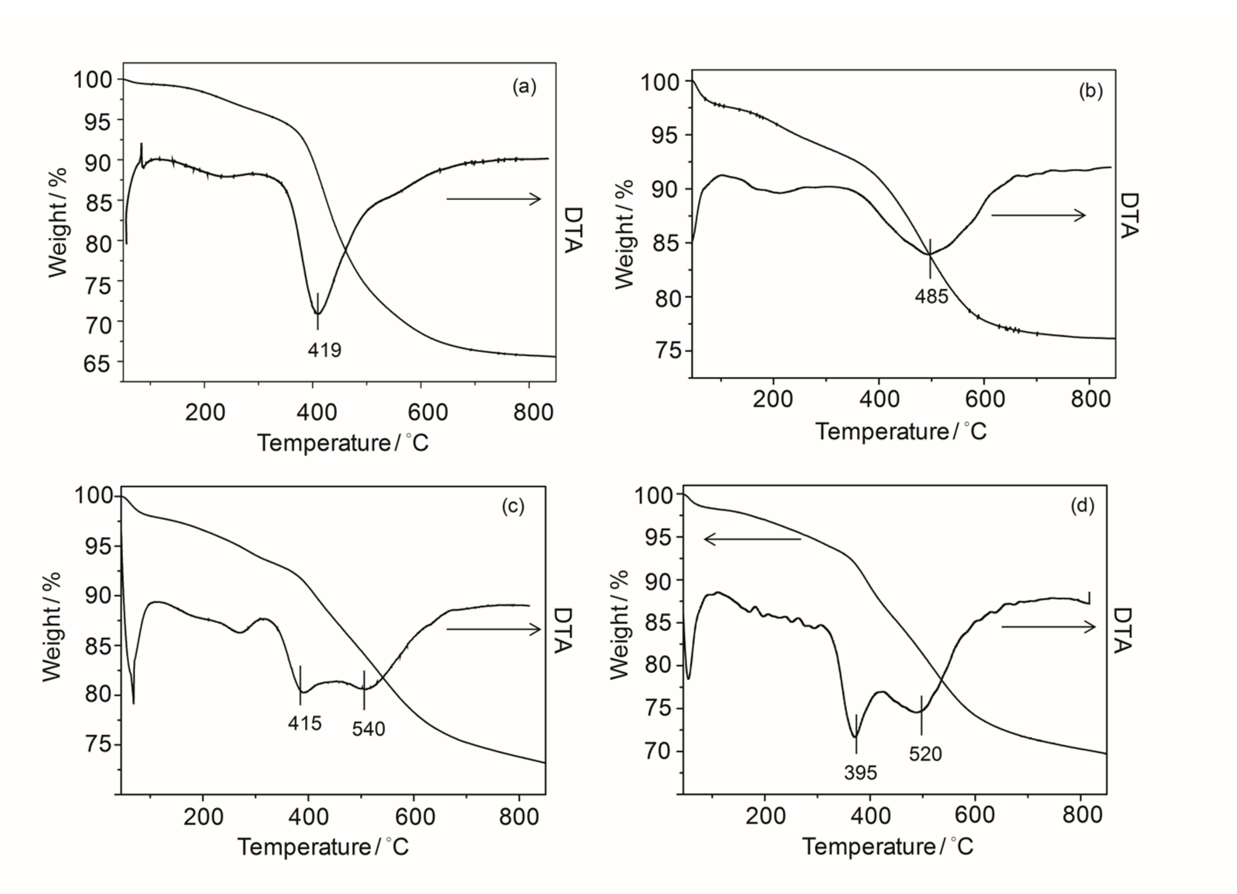

Fig. S1 TGA and DTA curves (a) as-synthesized CK-20, (b) template-extracted CK-20, (c) template-extracted CK-30, and (d) template-extracted CK-40.

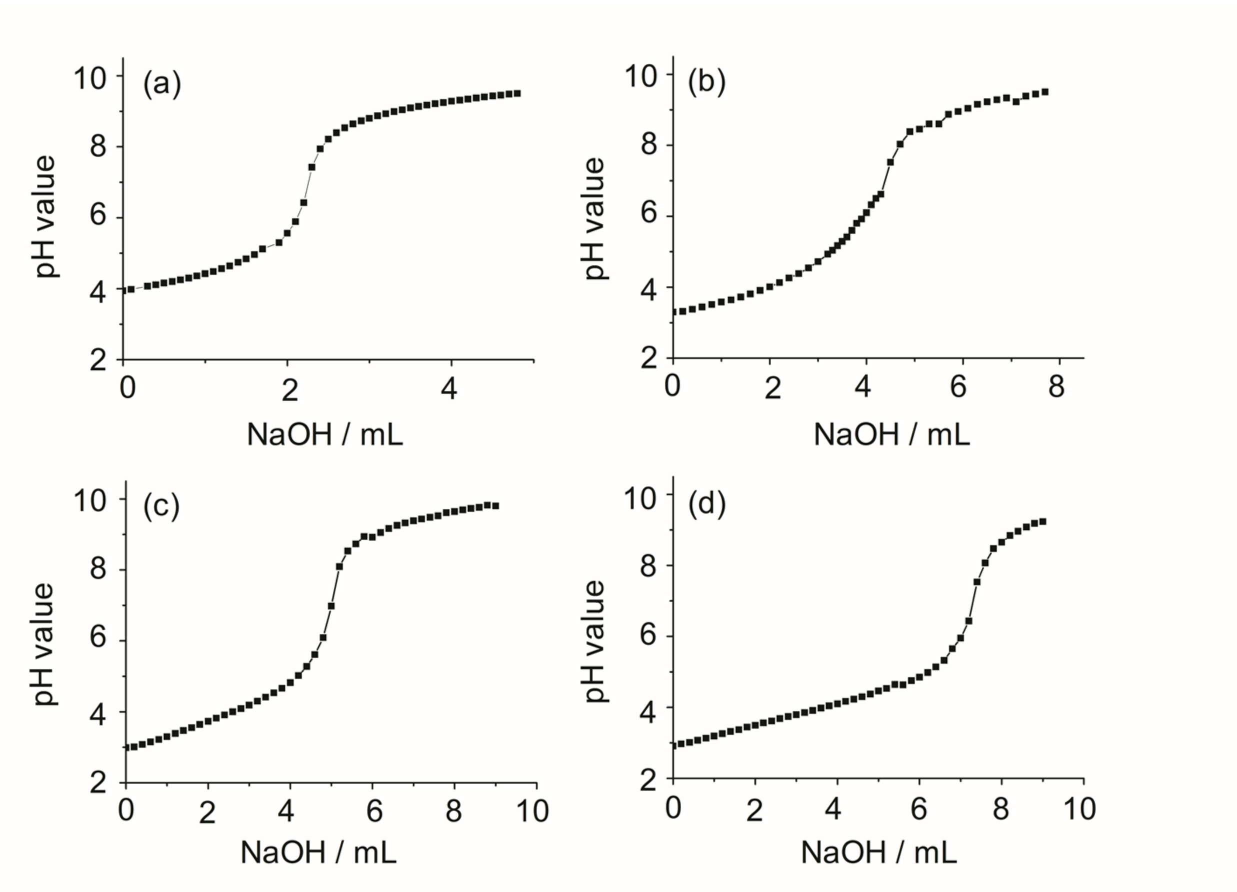

Fig. S2 Acid-base titration curves for template-extracted CK-x, where x = (a) 10, (b) 20, (c) 30, and (d) 40.

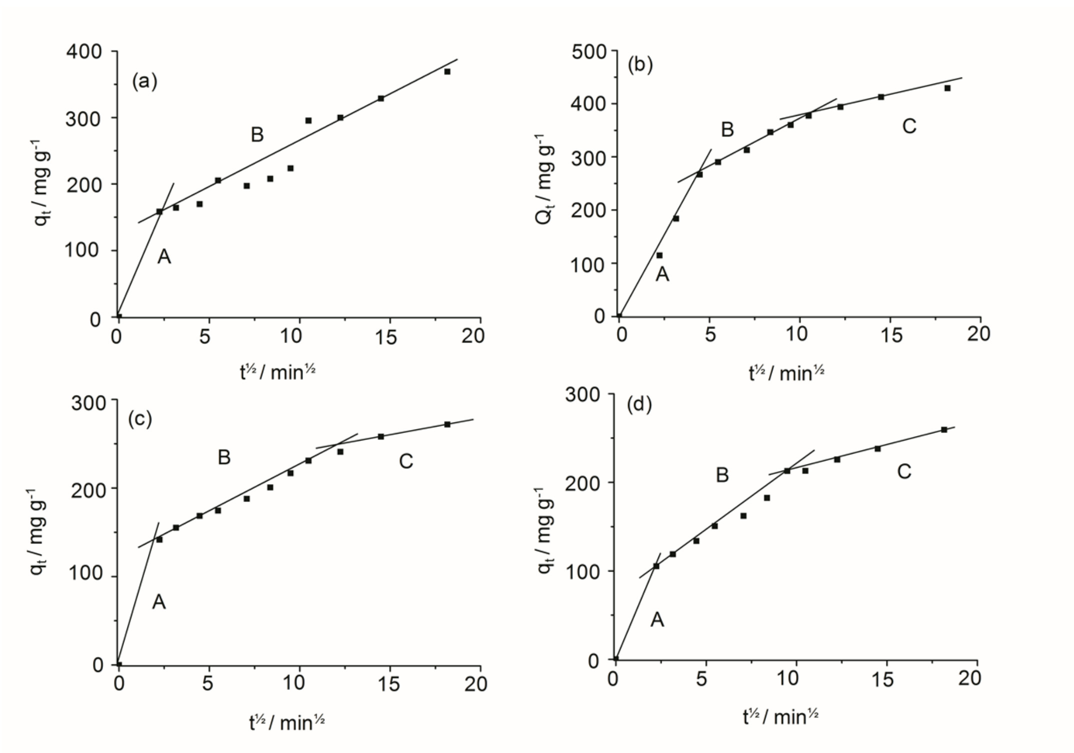

Fig. S3 The plots of (a) PF, (b) MB, (c) OII and (d) RhB adsorbed amounts versus the square root of adsorption time onto CK-30.

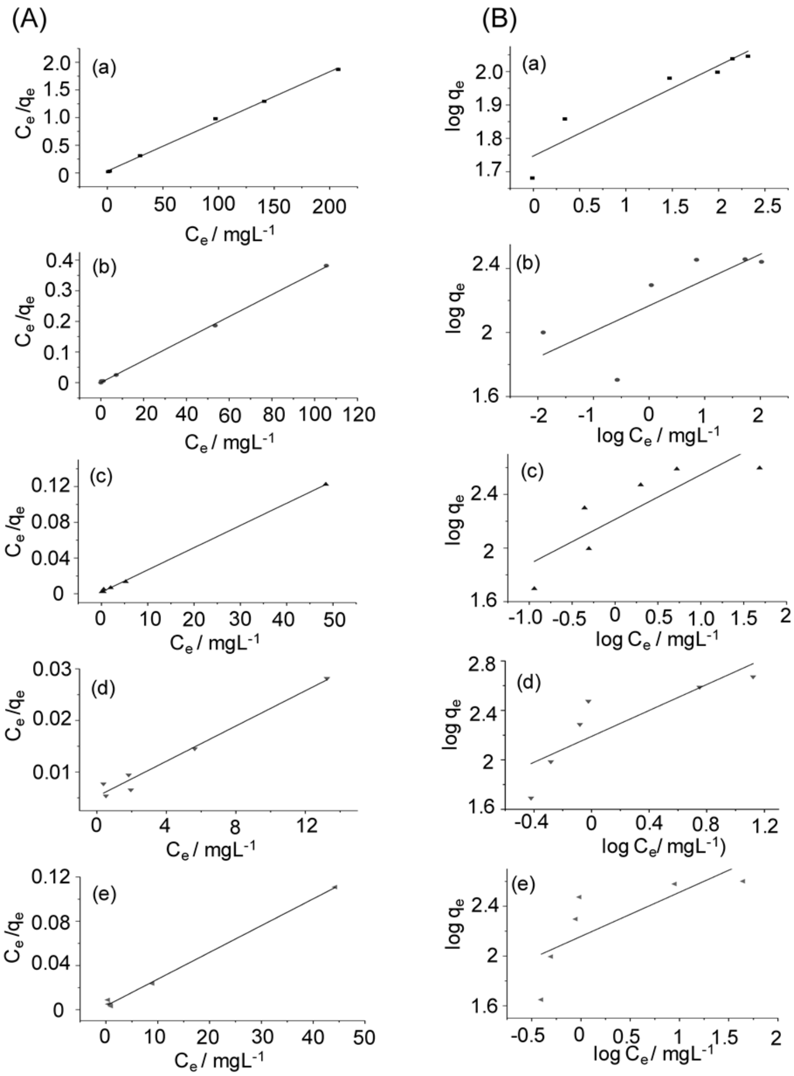

Fig. S4 (A) Langmuir and (B) Freundlich isotherm plots for MB adsorption onto CK-x where x= (a) 0, (b) 10, (c) 20, (d) 30 and (e) 40.

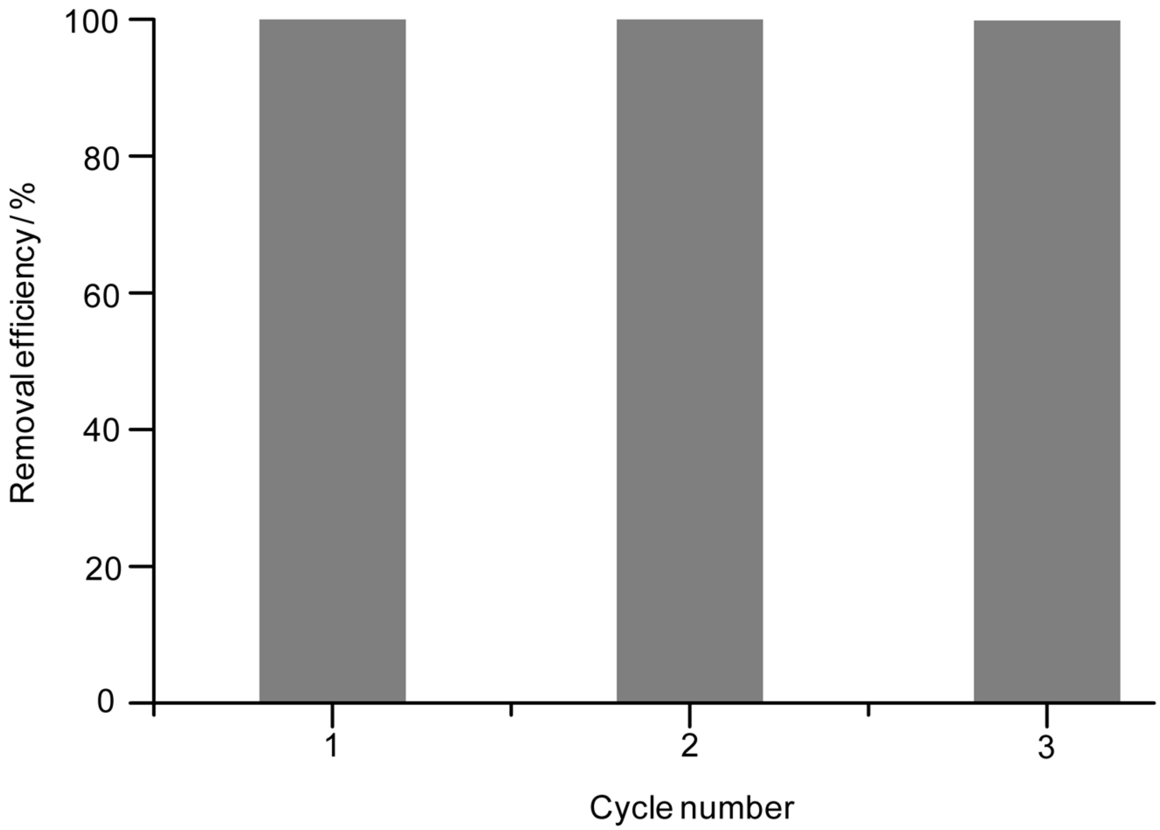

Fig. S5 MB removal efficiency of CK-30 in different cycles.

Table S1. Deconvolution Results of ^{29}Si MAS NMR for Template-Extracted CK-x

x	Q			T			$T^m/(Q^n+T^m)$ [%]
	Q^4 [%]	Q^3 [%]	Q^2 [%]	T^3 [%]	T^2 [%]	T^1 [%]	
10	62.9	24.7	1.7	9.8	1.0	0.0	10.9
20	55.0	22.8	2.7	16.5	2.1	0.9	19.6
30	47.2	19.9	2.1	26.0	3.8	1.0	30.8
40	43.5	15.0	1.8	33.3	5.6	0.8	39.7

Table S2. Methylene blue adsorption capacities of CK-x

Samples	Q_{max} [mg g^{-1}]	Q_{max} [mmol g^{-1}]	Acidic capacity [mmol g^{-1}]	Dye adsorption per unit –COOH [mmol $mmol^{-1}$]
CK-0	111	0.297	-	-
CK-10	284	0.760	0.44	1.727
CK-20	395	1.056	0.90	1.173
CK-30	470	1.257	1.00	1.257
CK-40	399	1.067	1.48	0.721

Table S3. Isotherm Parameters for MB Adsorption onto CK-x

Samples	Langmuir isotherm model			Freundlich isotherm model		
	q_{max} [mgg^{-1}]	K_L [Lmg^{-1}]	R^2	K_f [mg$^{(1-1/n)}$L$^{1/n}$ g^{-1}]	n	R^2
CK-0	112	0.27	0.997	5.73	7.41	0.873
CK-10	285	0	0.999	8.73	6.25	0.487
CK-20	417	1.33	0.999	9.15	3.00	0.673
CK-30	588	0.32	0.968	8.93	1.91	0.655
CK-40	416	0.71	0.996	8.65	2.82	0.485