Electronic Supporting Information (ESI) for

Towards efficient batch and column removal of Cr(VI) by carbon beads with developed nano-network

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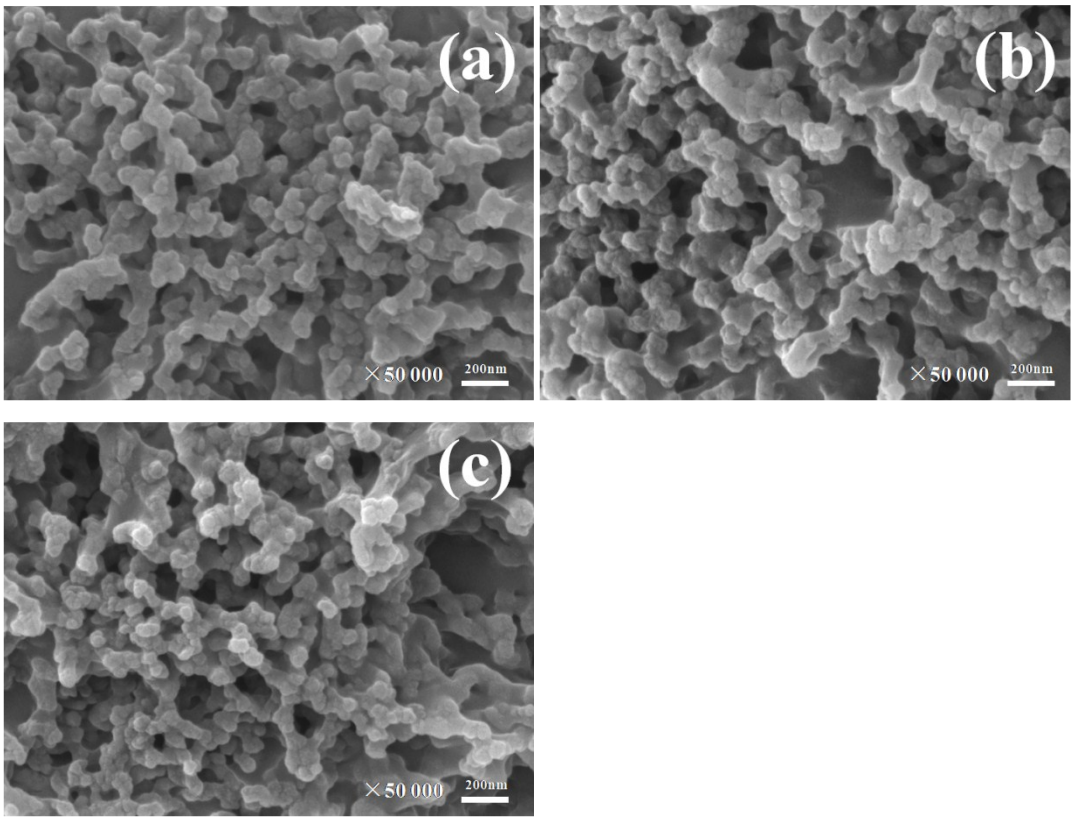
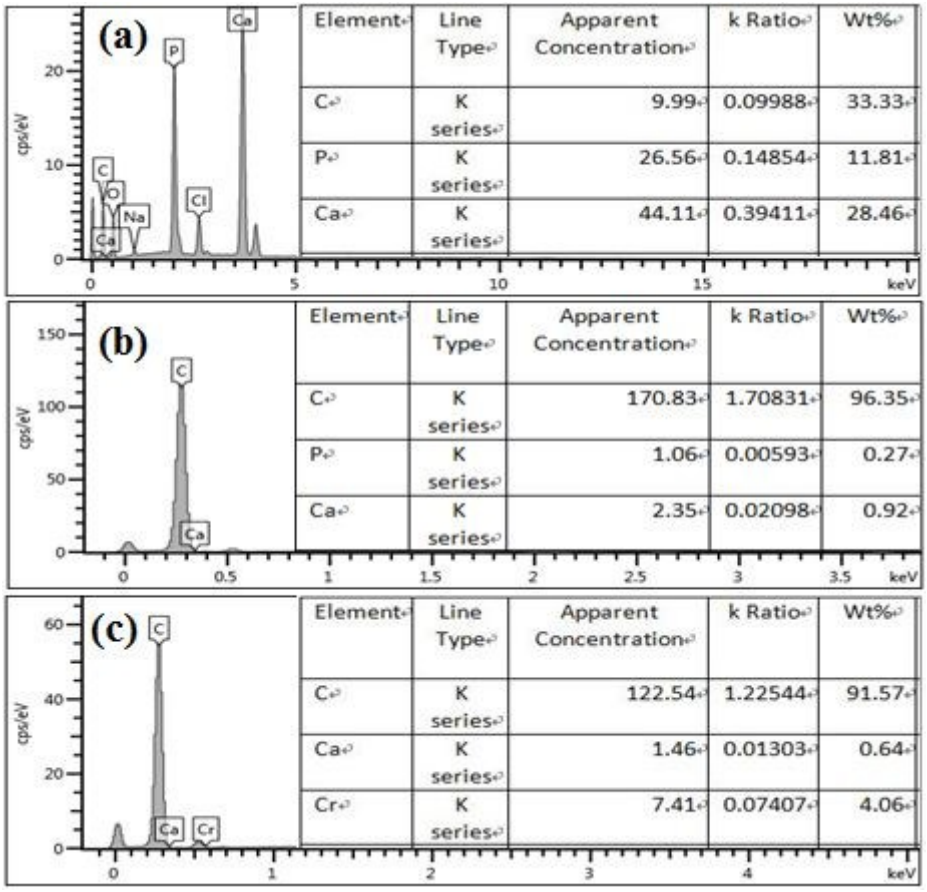


Fig. S1. FESEM images of the precursor (a),Alg-CB(b) and Alg-CB-Cr(c).



Element	Line Type	Apparent Concentration	k Ratio	Wt%
C	K series	9.99	0.09988	33.33
P	K series	26.56	0.14854	11.81
Ca	K series	44.11	0.39411	28.46

Element	Line Type	Apparent Concentration	k Ratio	Wt%
C	K series	170.83	1.70831	96.35
P	K series	1.06	0.00593	0.27
Ca	K series	2.35	0.02098	0.92

Element	Line Type	Apparent Concentration	k Ratio	Wt%
C	K series	122.54	1.22544	91.57
Ca	K series	1.46	0.01303	0.64
Cr	K series	7.41	0.07407	4.06

Fig. S2. EDS spectra of the precursor (a), Alg-CB (b) and Alg-CB-Cr (c).

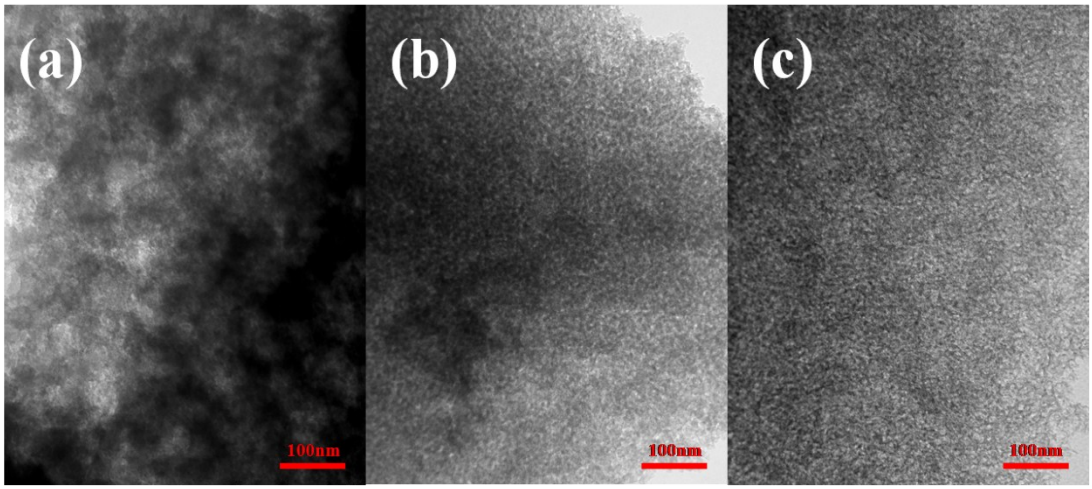


Fig. S3. TEM images of Alg-CB-400(a), Alg-CB-600(b) and Alg-CB-800(c).

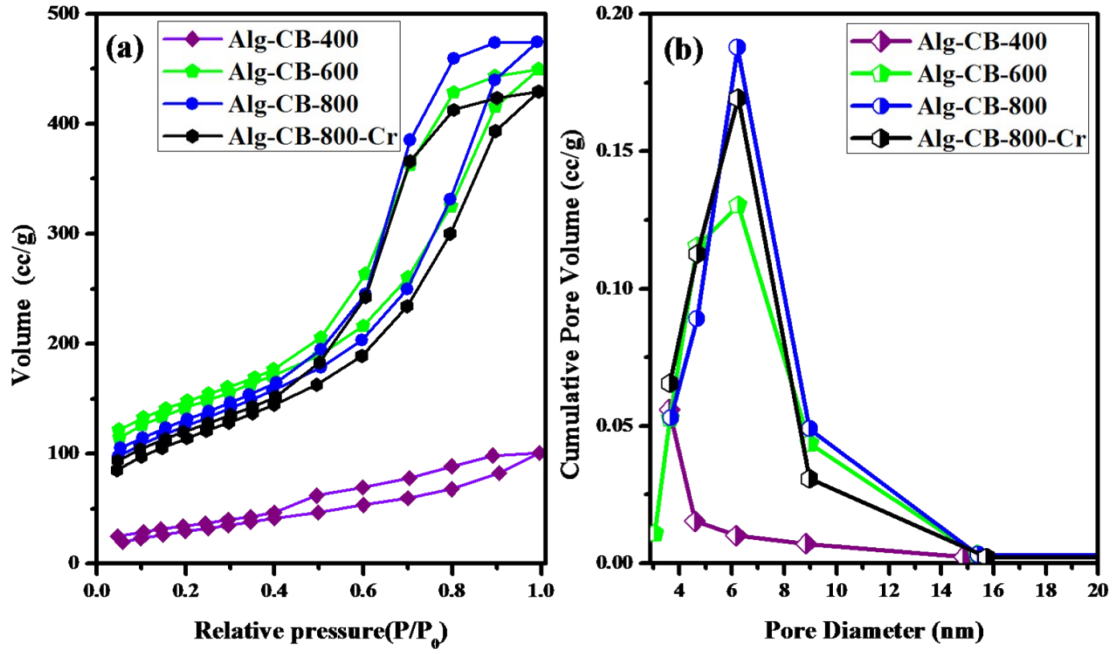


Fig. S4. N2 adsorption-desorption isotherms (a) and the pore distribution(b) of Alg-CB-X and Alg-CB-800-Cr.

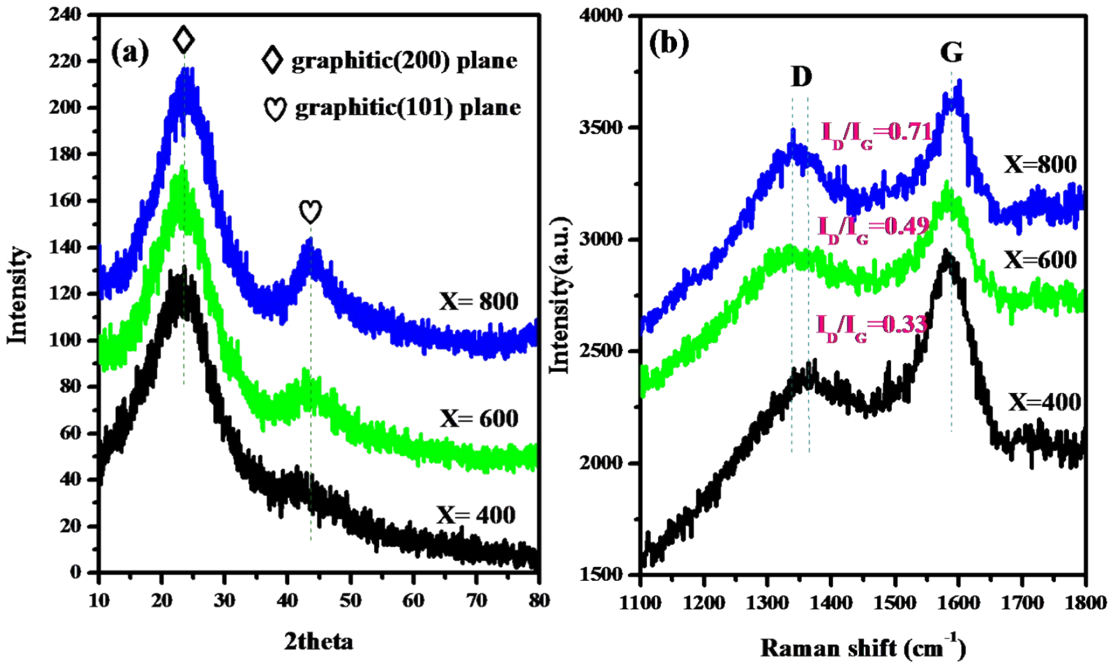


Fig. S5. XRD patterns (a) and Raman spectrum (b) of Alg-CB-X.

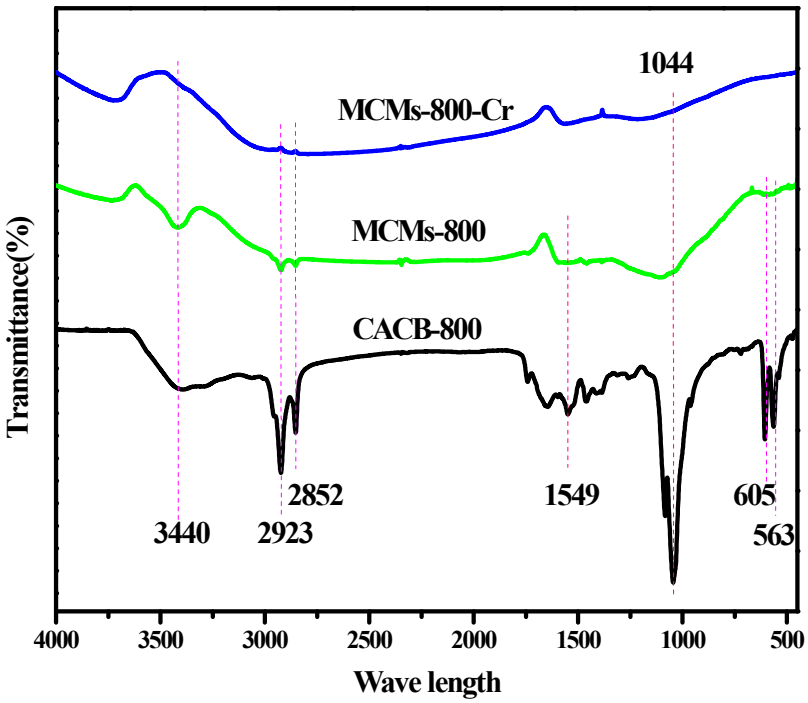


Fig. S6. FTIR spectra of the precursor, Alg-CB-800 and Alg-CB-800-Cr.

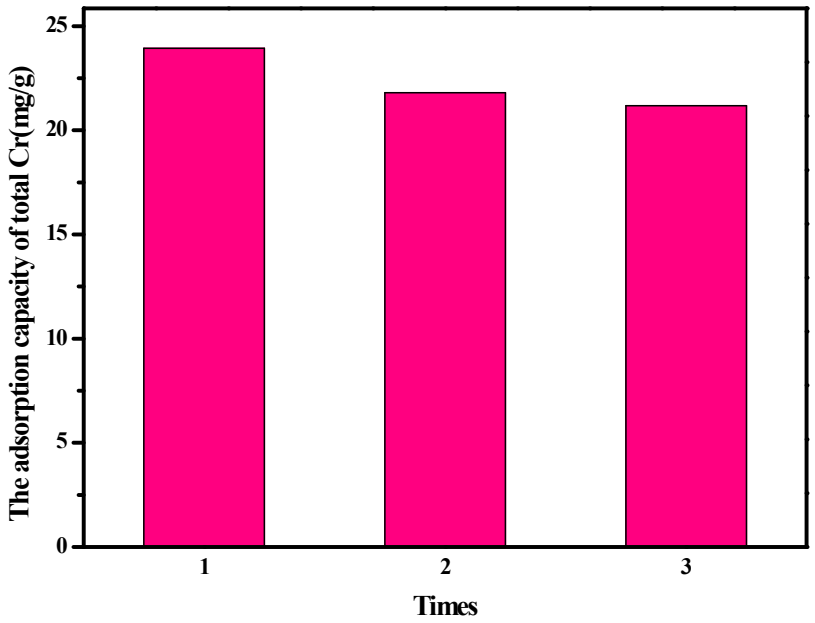


Fig. S7. The reusability of Alg-CB-800 removed the total Cr (initial Cr (VI) concentration, 25 mg L^{-1}; pH, 3.0; contact time, 4 h and temperature, 293± 2K).

Table S1. The BET parameters of the Alg-CB-X and Alg-CB-800-Cr.

Sample	S_{BET}(m^2 g^{-1})	V_{total}(cc g^{-1})	$D_{average}$(Å)
MCMs-400	112.2±0.4	0.16±0.01	54.9±0.1
MCMs-600	410.5±2.1	0.70±0.013	55.5±0.1
MCMs-800	444.0±2.8	0.73±0.02	66.1±0.2
MCMs-800-Cr	405.2±2.3	0.66±0.01	65.6±0.1

Table S2 The Cr(VI) removal capacity of Fe-SA-800 compared with other similar materials

Adsorbent	Batch Adsorption Capacity(mg g^{-1})	pH	Column Adsorption Capacity(mg g^{-1})	Reference
Porous Titania Bead	8.90	2	\	29
Fe_3O_4@Alg-Ce	14.29	5	\	30
Alg-MMT/PANI	29.89	2	\	31
Fe-SA-800	86.32	2	\	42
IL- oxi-MWCNTs	85.83	2.8	\	56
Alg-CB-800	50.4±0.4	3	45.2±0.4	This work