Effect of electrochemical reduction and oxidation of a viscose rayon based activated carbon cloth for Cr(VI) sorption from aqueous solution

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Supporting Information

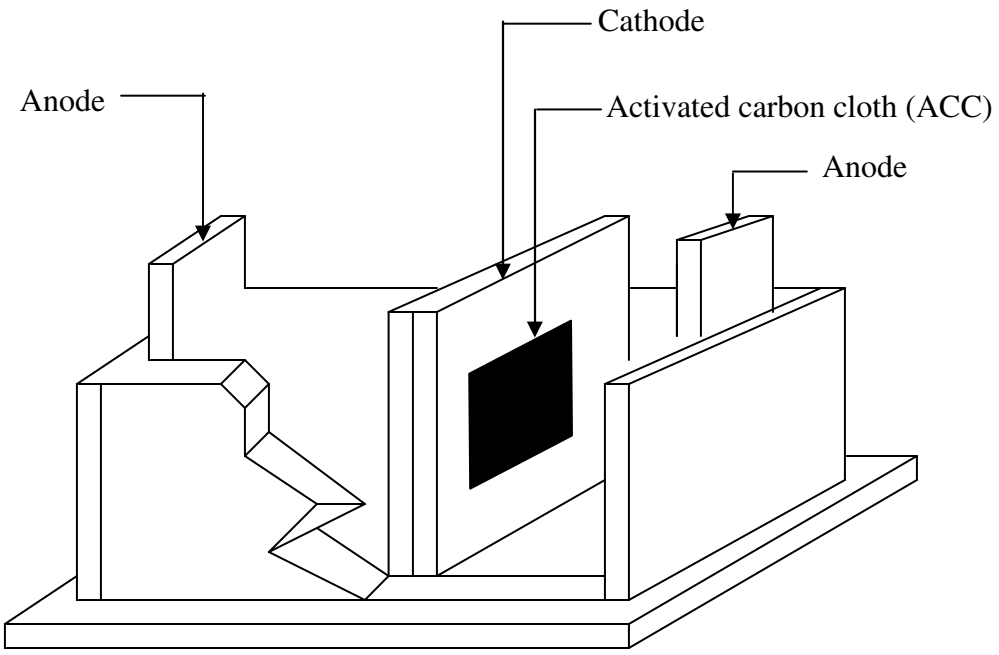
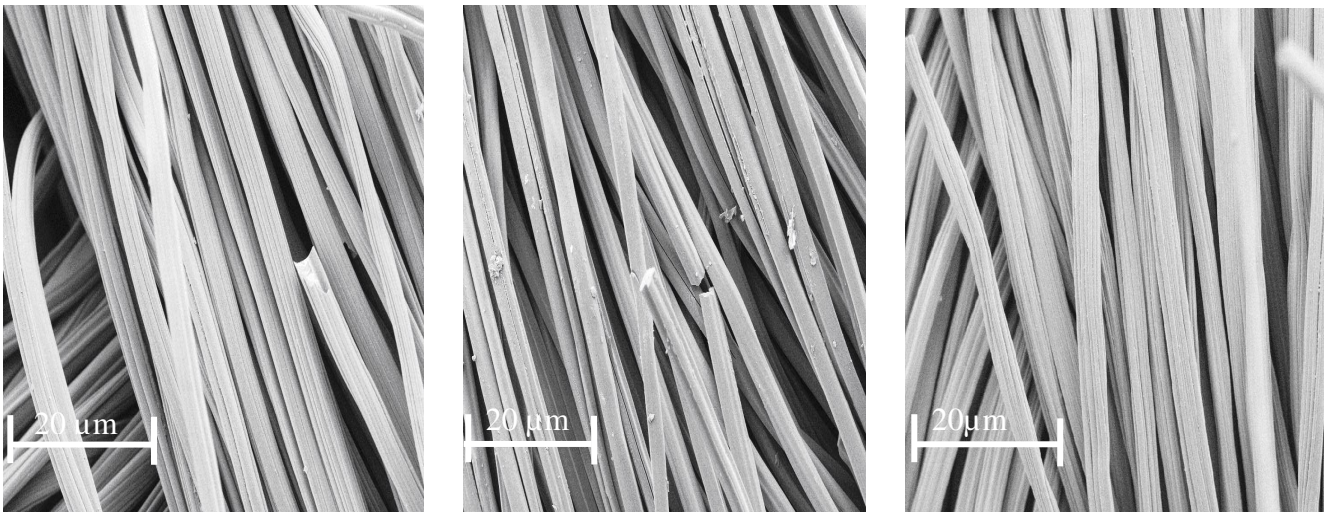


Figure S1. Schematic of the electrochemical cell used for electrochemical reduction.

1. Scanning Electron Microscopy (SEM)

Scanning electron micrographs (SEMs) of as-received ACC, EO ACC and ER ACC used in this investigation are shown in Figure S2. The micrographs of the three ACCs are very similar. Therefore, no significant breakage of fibres was observed during electrochemical oxidation of ACC at 1.1 A for 6 h, and electrochemical reduction of ACC at 5.5 A for 3 h. Therefore, all ACCs used in this investigation are suitable for adsorption studies**.**



(a) As received ACC (b) EO ACC (c) ER CC

Figure S2. SEM of ACCs: (a) as -received ACC, (b) EO ACC and (c) ER ACC.

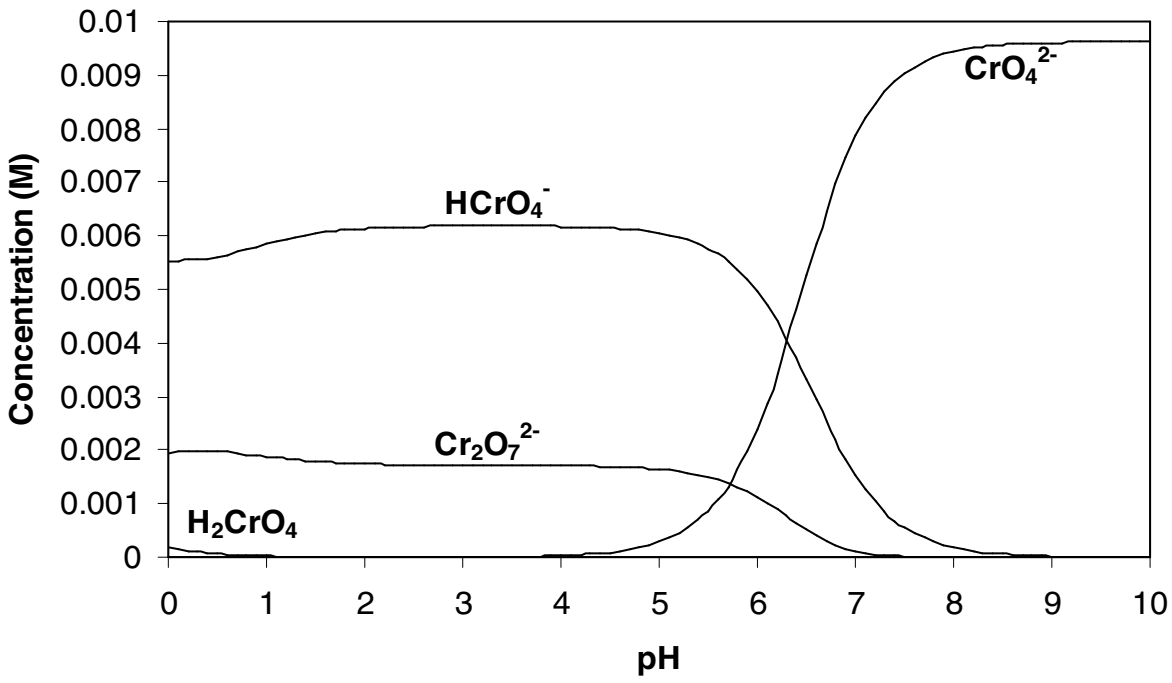


Figure S3. Speciation curve for 0.01 M chromium(VI) in sodium dichromate solution

Table S1. Langmuir and Freundlich isotherm constants and experimental values for maximum chromium(VI) ions sorbed (q_e) for ACCs at pH values of 4, 6 and 8

Sample	pH	q_e (mmol/g)	Langmuir isotherm constants			Freundlich isotherm constants		
			q_{max} (mmol/g)	b	R^2	K_f	1/n	R^2
As -received ACC	4	1.79	1.96	2.685	0.996	1.124	0.345	0.856
As -received ACC	6	0.78	0.815	2.785	0.998	0.506	0.264	0.851
As -received ACC	8	0.074	0.0799	1.326	0.987	0.043	0.297	0.896
ER ACC	4	3.8	3.949	5.167	0.999	2.798	0.302	0.891
ER ACC	6	1.86	1.914	3.693	0.981	1.256	0.259	0.899
ER ACC	8	0.64	0.679	2.654	0.997	0.425	0.248	0.838
EO ACC	4	0.173	0.208	0.838	0.993	0.089	0.366	0.889
EO ACC	6	0.44	0.448	2.048	0.977	0.265	0.277	0.883
EO ACC	8	0.84	0.83	6.394	0.99	0.658	0.131	0.886

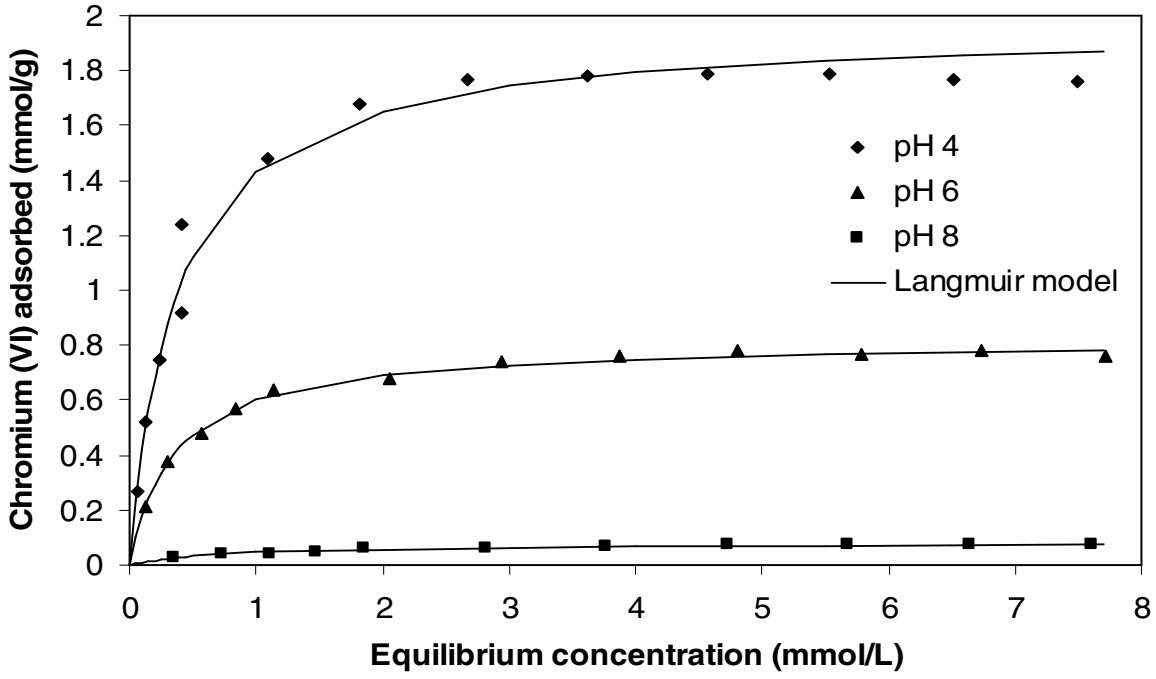


Figure S4. Sorption isotherms of chromium(VI) onto as-received ACC at pH 4, 6 and 8

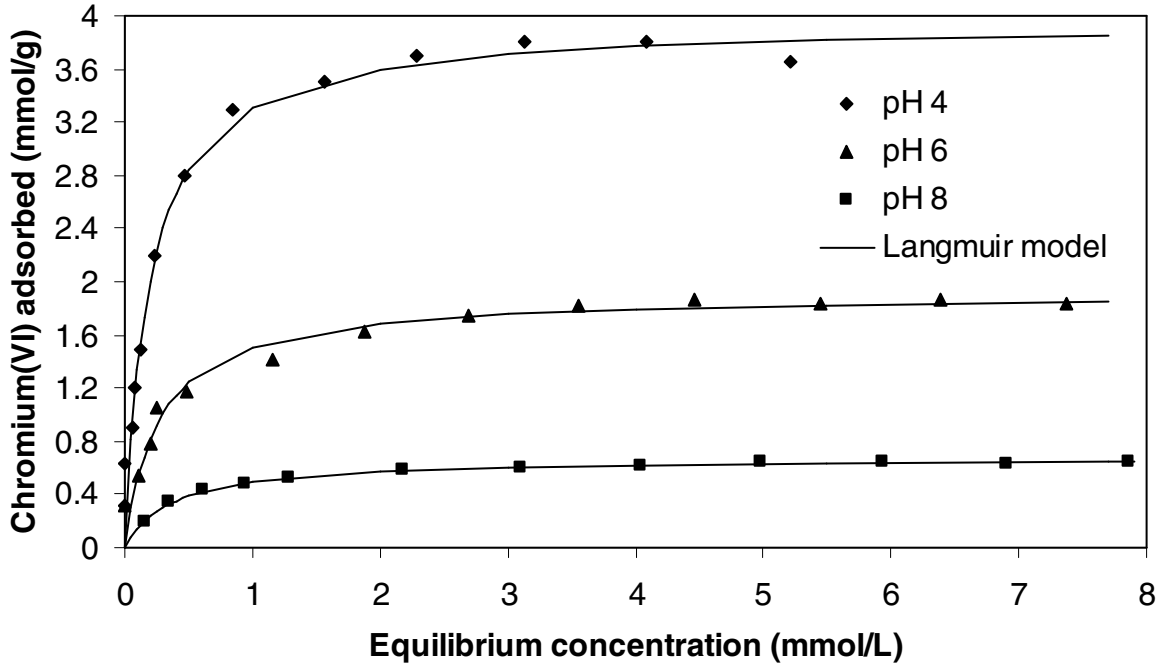


Figure S5. Sorption isotherms of chromium(VI) onto ER ACC at pH 4, 6 and 8

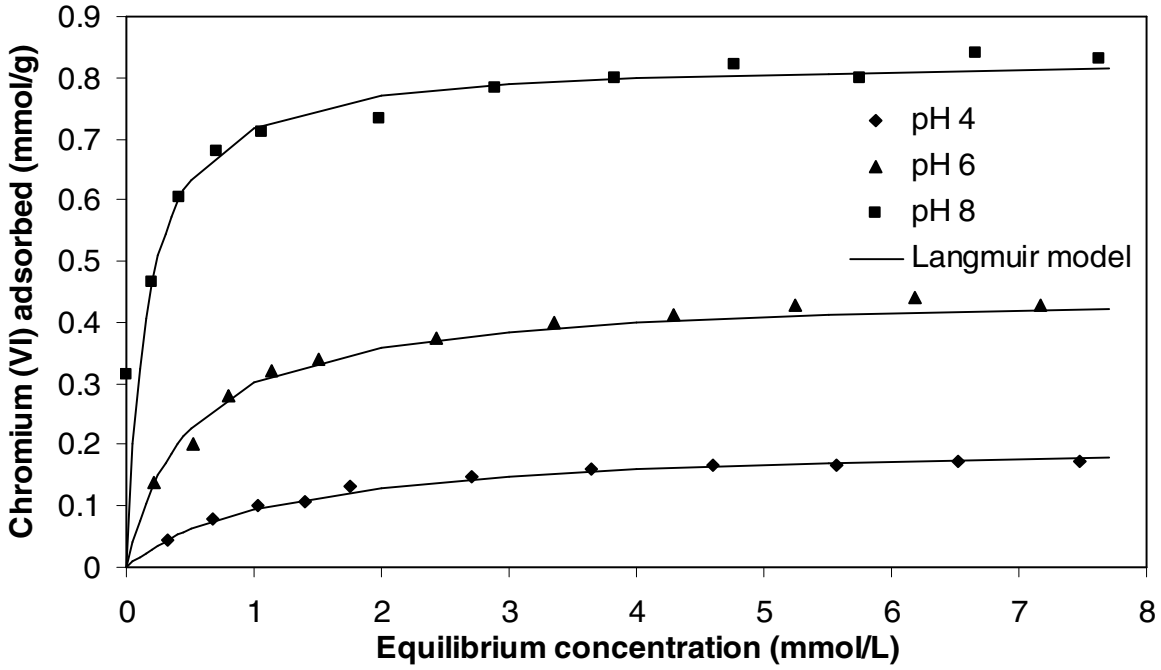


Figure S6. Sorption isotherms of chromium(VI) onto EO ACC at pH 4, 6 and 8