Supporting information

Enhanced Cr(VI) removal by Co and PPy co-modified Ca-Al-layered double hydroxides due to adsorption and reduction mechanisms

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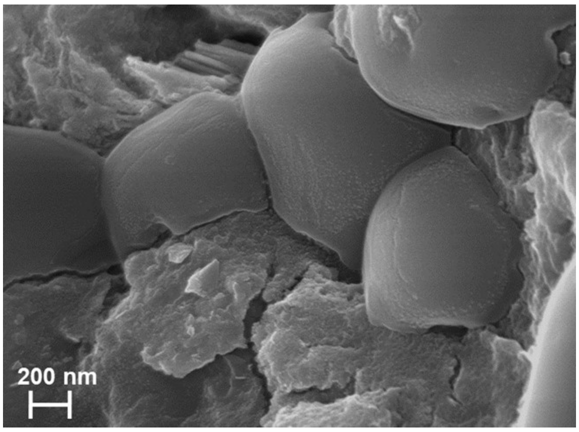

Fig. S1 SEM image of CCAL (Co:Ca:Al=1.5:2:1).

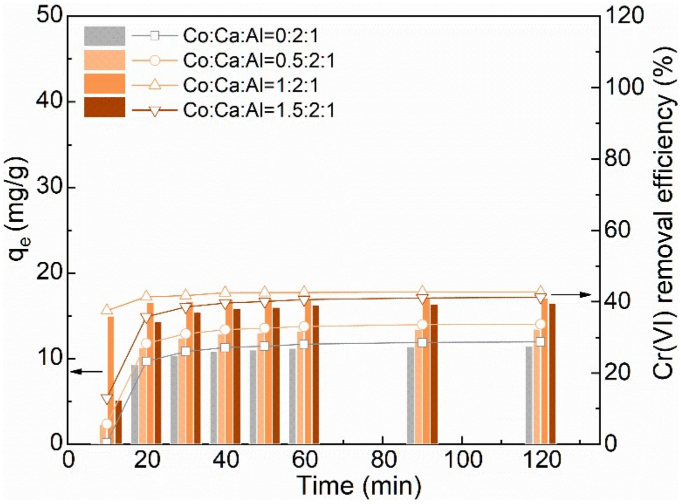

Fig. S2 Effect of molar ratio of Co:Ca:Al on the adsorption capacity and removal efficiency of Cr(VI) in 120 min.

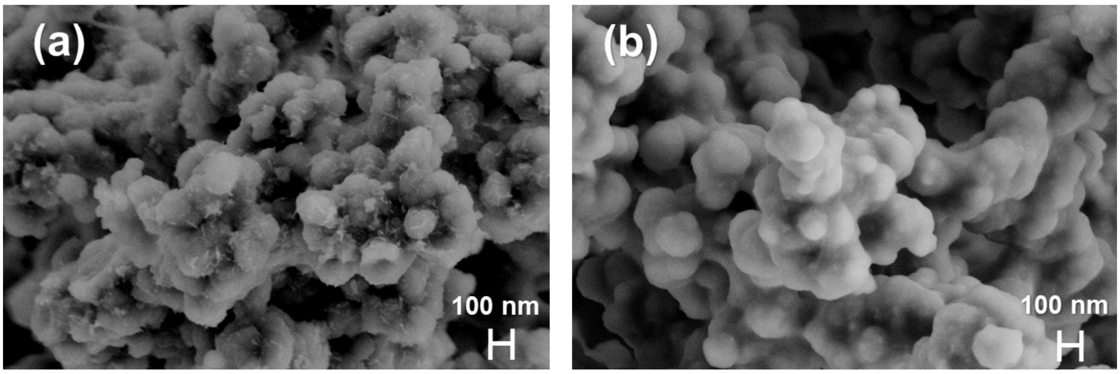

Fig. S3 SEM of CCALP prepared at (a) polymerization temperatures of 60 °C, and (b) polymerization time of 24 h.

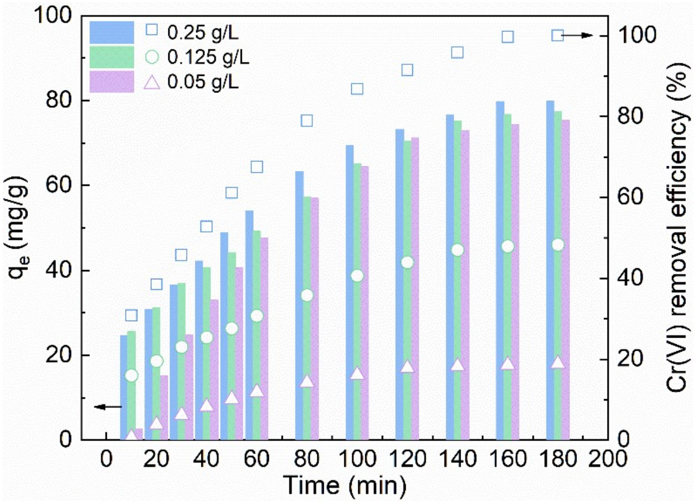

Fig. S4 Effect of low CCALP concentration on the adsorption capacity and efficiency of Cr(VI) in 180 min.

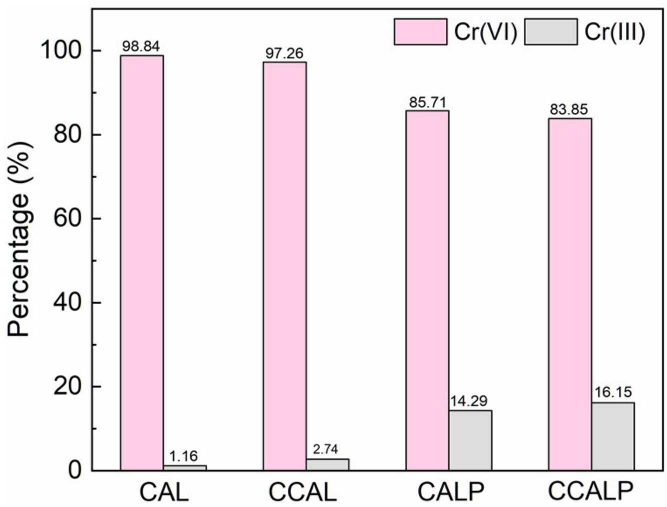

Fig. S5 The conversion ratio of Cr(VI) to Cr(III) by the four sorbents.

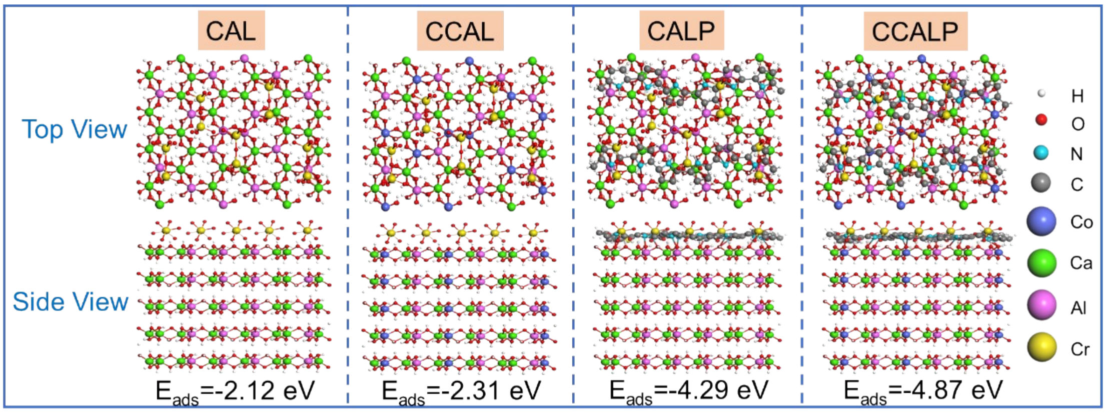

Fig. S6. Top and side views for atomic structures of CAL, CCAL, CALP and CCALP after $Cr_2O_7^{2-}$ adsorption.

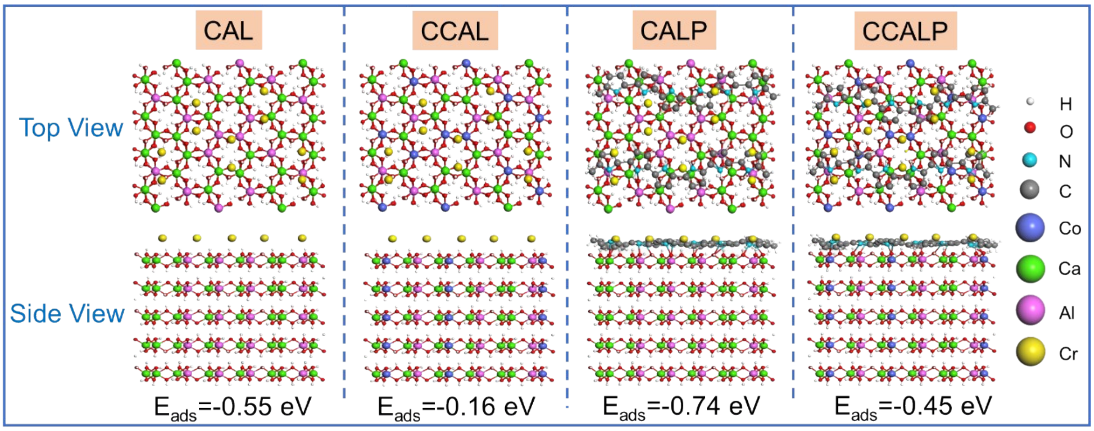

Fig. S7. Top and side views for atomic structures of CAL, CCAL, CALP and CCALP after Cr(III) adsorption.

Table S1 Pore structure parameters of adsorbents.

Adsorbents	S_{BET} (m^2/g)	Total pore volume (cm^3/g)	Average aperture (nm）
CAL	14.21	0.0522	14.67
CCAL	1.55	0.0119	30.49
CALP	9.97	0.0300	3.07
CCALP	20.56	0.0810	12.11

Table S2 Mean and regression data of Langmuir and Freundlich isotherms for Cr(VI) adsorption by different adsorbents at different temperatures.

	Adsorbents	Temperature (K)	Q_{max} (mg/g)	b (L/mg)	R^2	R_L
Langmuir	CAL	298	13.59	0.2037	0.8674	0.20
		308	17.05	0.2817	0.9272	0.15
		318	19.42	0.3300	0.9273	0.13
	CCAL	298	28.87	0.1923	0.8991	0.21
		308	32.73	0.1692	0.9249	0.23
		318	35.44	0.1513	0.9120	0.25
	CALP	298	438.09	0.0053	0.9588	0.90
		308	492.88	0.0062	0.9594	0.89
		318	594.64	0.0050	0.9357	0.91
	CCALP	298	635.30	0.0053	0.9579	0.90
		308	734.98	0.0046	0.9553	0.92
		318	845.25	0.0039	0.9599	0.93
	Adsorbents	Temperature (K)	K_f $((mg/g)/(mg/L)^{1/n})$	n	R^2	-
Freundlich	CAL	298	9.53	16.67	0.6806	-
		308	12.99	22.44	0.7710	-
		318	15.33	25.69	0.7815	-
	CCAL	298	19.41	14.29	0.8363	-
		308	21.40	14.42	0.7583	-
		318	22.31	13.30	0.7226	-
	CALP	298	13.08	1.96	0.8807	-
		308	17.66	2.04	0.8692	-
		318	16.13	1.90	0.8621	-
	CCALP	298	19.01	1.96	0.8796	-
		308	17.82	1.85	0.8850	-
		318	16.16	1.76	0.8996	-