Electronic Supporting Information (ESI) for

Interior multi-cavities/surface engineering of alginate hydrogels with PEI for exceptionally efficient chromium removal in batch and continuous aqueous systems

Yong-Zhu Yan [a], Qing-Da An [a,*], Zuo-Yi Xiao [a], Shang-Ru Zhai [a,*], Bin Zhai [a], Zhan Shi [b]

[a] *Faculty of Light Industry and Chemical Engineering, Dalian Polytechnic University, Dalian 116034, China*

[b] *State Key Laboratory of Inorganic Synthesis and Preparative Chemistry, College of Chemistry, Jilin University, Changchun 130012, China*

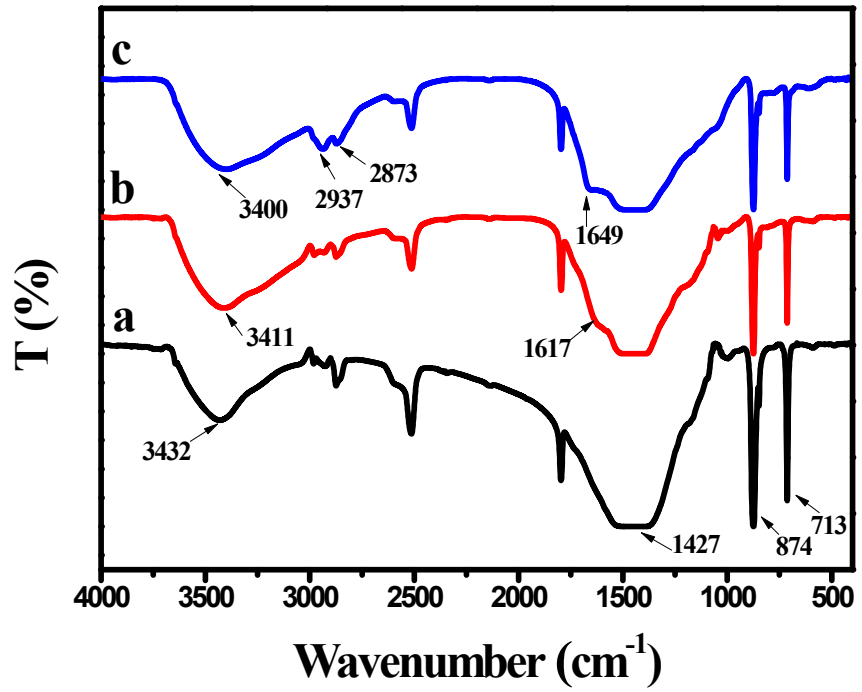

Fig. S1. FT-IR spectra of (a) $CaCO_3$, (b) $CaCO_3$@PDA and (c) $CaCO_3$@PDA@PEI;

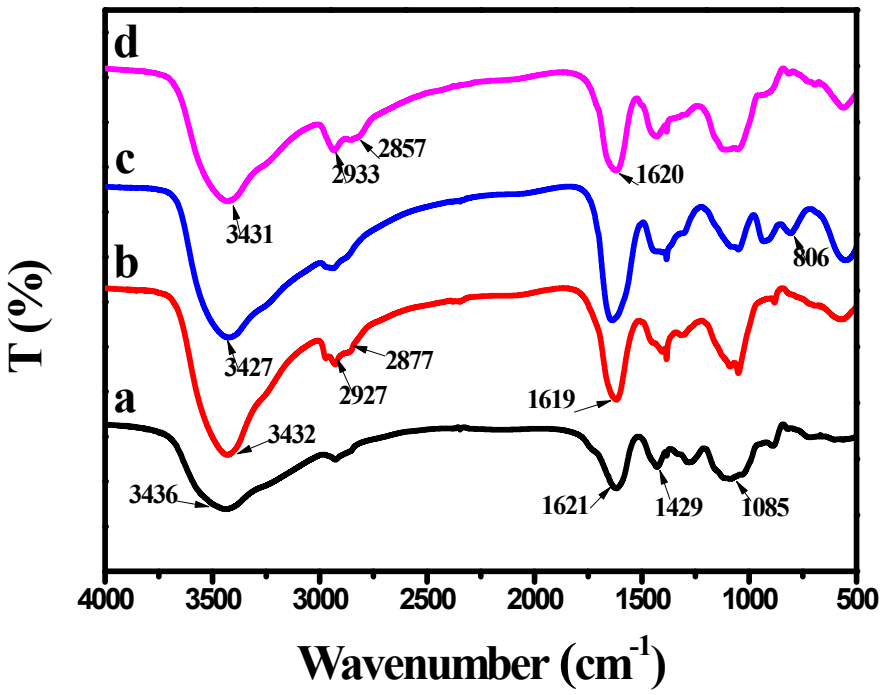

Fig. S2. FT-IR spectra of (a) 0.7-HS-SA, (b) 0.7-HS-PDA@PEI-SA@PEI, (c) 0.7-HS-PDA@PEI-SA@PEI-Cr and (d) F-SA.

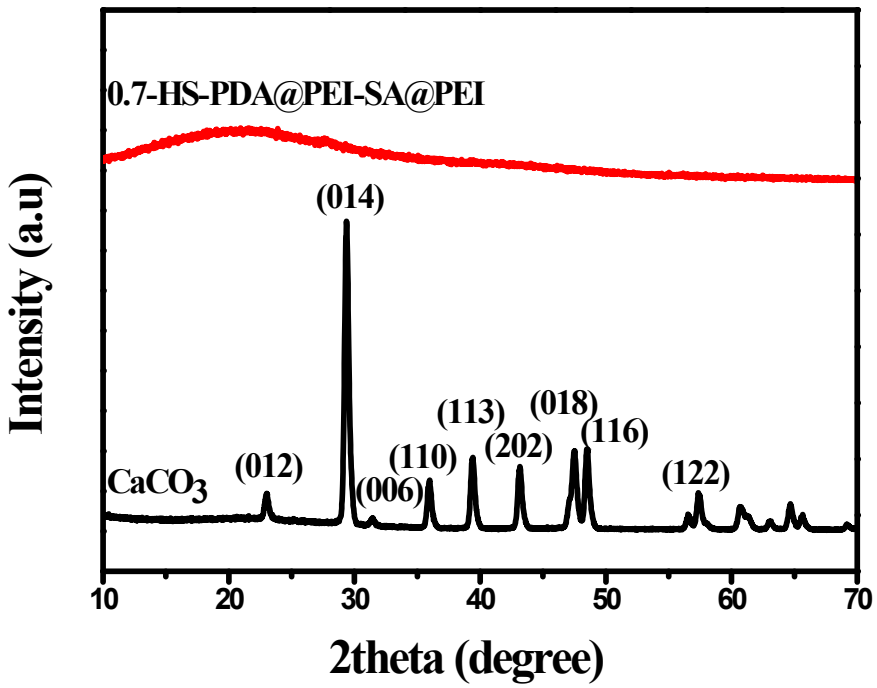

Fig. S3. XRD patterns of the $CaCO_3$ and 0.7-HS-PDA@PEI-SA@PEI.

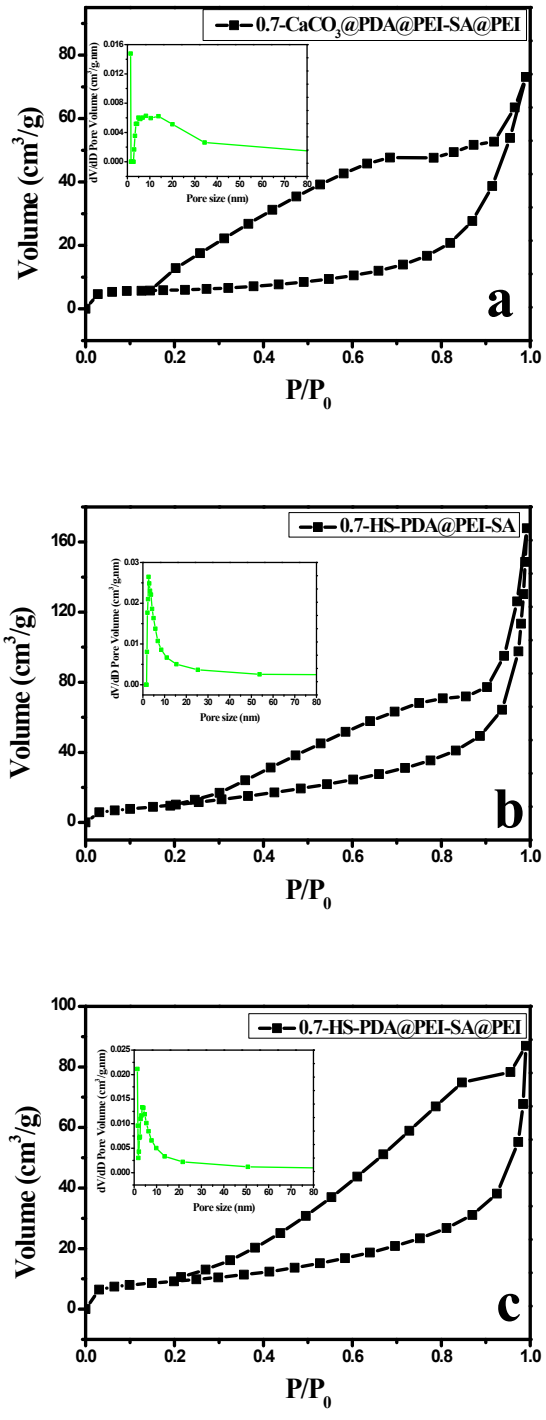

Fig. S4. Nitrogen adsorption–desorption isotherms and BJH pore size distribution curves of (a) 0.7-$CaCO_3$@PDA@PEI-SA@PEI, (b) 0.7-HS-PDA@PEI-SA and (c) 0.7-HS-PDA@PEI-SA@PEI.

Before adsorption **After five recycling**

Fig. S5. The photos of 0.7-HS-PDA@PEI-SA@PEI (before adsorption) and after five recycling.

Table S1 Textural characteristics of studied samples.

Samples	Specific surface area (m^2 g^{-1})	Total pore volumes (cm^3 g^{-1})	Average pore size (nm)
0.7-$CaCO_3$@PDA@PEI-SA@PEI	20	0.12	17.3
0.7-HS-PDA@PEI-SA	41	0.26	25.2
0.7-HS-PDA@PEI-SA@PEI	32	0.14	16.6