Supporting Information for

Cost effective biochar gels with super capabilities forheavy metal removal

Pan-pan Chen [a], Hong-ping Zhang [a, *], Huan-de Liu [b], Xue-gang Luo [a], Xiao-yan Lin [a], Xiong Lu [c], Youhong Tang [d,*]

[a] Engineering Research Center of Biomass Materials, Ministry of Education, School of Materials Science and Engineering, Southwest University of Science and Technology, Mianyang, Sichuan 621010, China

[b] Western Mining Co. Ltd, the key laboratory of mineral processing and comprehensive utilization in the Plateau of Qinghai Province, Xining 810007, Qinhai, China.

[c] Key Laboratory of Advanced Technologies of Materials, Ministry of Education, School of Materials Science and Engineering, Southwest Jiaotong University, Chengdu, Sichuan 610031, China

[d] Centre for NanoScale Science and Technology and School of Computer Science, Engineering and Mathematics, Flinders University, South Australia 5042, Australia

[*] Corresponding authors. Tel: +86-816-6089009, Fax: +86-816-6089009, E-mail: zhp1006@126.com (H. P. Zhang) and Tel: +61-8-82012128, Fax: +61-8-82013618, E-mail: youhong.tang@flinders.edu.au (Y Tang)

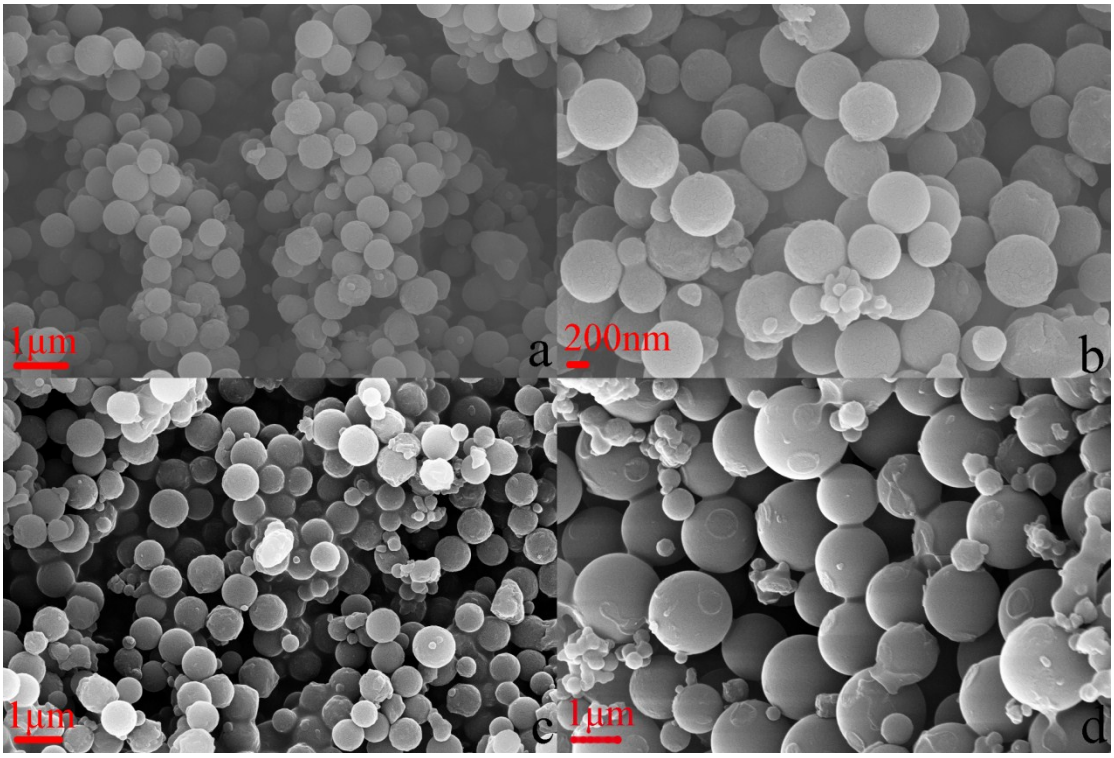

Fig. S1. The SEM images of KGMBs with different sizes

Fig. S1 shows KGMBs with different sizes. They were fabricated by adjusting the KGM and solvent ratio(W/V).The ratios of KGM and solvent in Fig. S1 are (a) 0.6:8, (b) 1.0:8, (c) 1.2:8 and (d) 1.4:8, respectively. The KGMBs show the regular spherical appearance and the KGMB has the smallest size when KGM and solvent ratio is 1.0:8. It exhibits the good dispensability and possess larger amount of active sites for adsorption.

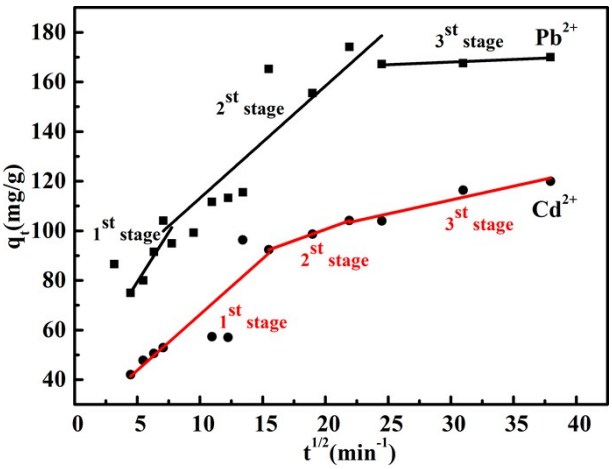

Fig. S2. The intra-particle diffusion model fitting on the relationship between contact time and Pb^{2+} and Cd^{2+} adsorption capacity onto KGMB.

Table. S1 The mean diameters of KGMBs prepared with different KGM to solvent ratios.

KGM: solvent	Mean diameter (nm)
0.6:8	615.7
1.0:8	512.4
1.2:8	675.5
1.4:8	869.3

Table. S1 shows the mean diameter of KGMBs at the different synthesis KGM to solvent ratios. Under the ratio of 1.0:8, the KGMB owns the smallest size which could be beneficial to remove of Pb^{2+} and Cd^{2+}.