**Ion-induced synthesis of alginate fibroid hydrogel for heavy metal ions removal**

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FIGURE S1 Effect of time on the removal ratios of SAFH for Cu2+, Cd2+ and Pb2+.

TABLE S1 Comparison of saturated adsorption capacities (mg·g-1) of different materials

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| Adsorbents | Cu2+ | Cd2+ | Pb2+ | Reference |
| SAFH | 315.92 | 232.35 | 465.22 | This work |
| PVA/PAA gel | — | 115.88 | 194.99 | (Chu et al. 2015) |
| PSA-GO gel | — | 238.30 | — | (Xu et al. 2015) |
| biochar | 34.20 | 28.10 | 153.10 | (Wang et al. 2015) |
| AMPS | 100.86 | 134.66 | 120.14 | (Ozay et al. 2009) |
| Fraxinus excelsior tree leaves | 33.10 | 67.20 | 172.00 | (Sangi et al. 2008) |
| PAM/TGA/DHBA | — | 294.08 | 452.25 | (Mohammadi et al. 2017) |
| PAAm/TGA |  | 291.73 | 345.00 | (Mohammadi, Shangbin, Berkland,Liang 2017) |
| GO-DPA | 347.00 | 253.00 | 360.00 | (Zare-Dorabei et al. 2016) |

TABLE S2 Kinetic rate constants and calculated adsorption capacity of heavy metal ions

|  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- |
| Metal ions | *Qe,exp* (mg·g-1) | Pseudo-first-order model | | | Pseudo-second-order model | | |
| *R2* | *Qe,1* (mg·g-1) | *K1* (min-1) | *R2* | *Qe,2* (mg·g-1) | *K2*(g·(mg•min)-1) |
| Cu2+ | 24.34 | 0.156 | 3.48 | 0.013 | 0.956 | 28.72 | 0.065 |
| Cd2+ | 33.64 | 0.860 | 9.29 | 0.034 | 0.937 | 39.56 | 0.051 |
| Pb2+ | 23.66 | 0.232 | 2.14 | 0.053 | 0.912 | 34.00 | 0.014 |

TABLE S3 Partition and selectivity coefficients of competitive adsorption on heavy metal ions

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
| Metal ions | *Kd* | | | *α* | | |
| Cu2+ | Cd2+ | Pb2+ | Pb2+/ Cu2+ | Pb2+/ Cd2+ | Cu2+/ Cd2+ |
| Cu2+ + Cd2+ | 0.509 | 0.491 | — | — | — | 1.036 |
| Cu2+ + Pb2+ | 0.494 | — | 0.506 | 1.025 | — | — |
| Cd2+ + Pb2+ | — | 0.493 | 0.507 | — | 1.028 | — |
| Cu2+ + Cd2+ + Pb2+ | 0.331 | 0.312 | 0.357 | 1.079 | 1.144 | 1.059 |

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