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## Synthesis of novel modified magnetic chitosan particles and their adsorption performance toward Cr (VI)

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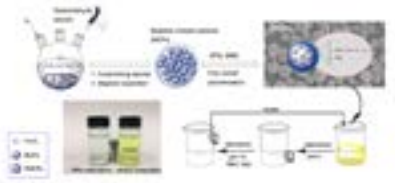
With the significant increase in production and use of heavy metal (especially hexavalent chromium), it will be inevitably released into aquatic environments, which can result in accumulating throughout the food chain and having high toxicity to the living organisms. Therefore, developing a kind of low-cost adsorbent with high adsorption capacity of Cr(VI) from aqueous solution have attracted extensive attention. In this study, novel adsorbents, poly([2-(methacryloxy)ethyl]trimethylammonium chloride) modified magnetic chitosan particles (DMCPs), were synthesized under N2 atmosphere via free radical polymerization using [2-(methacryloxy)ethyl] trimethylammonium chloride (DMC) as grafting monomer and potassium persulfate (KPS) as initiator, and applied to adsorb Cr(VI) from aqueous solution. The effects of pH (2-11), Cr(VI) concentration (10-200 mg/L) contact time (0-420 min) on the adsorption performance were evaluated. The results showed that the adsorption capacity of DMCPs was much larger than that of magnetic chitosan particles (MCPs) in the examined pH range and decreased with Cl- concentration increasing, indicating that electrostatic interaction and ion exchange are the governing mechanisms of Cr(VI) adsorption by DMCPs. The Langmuir isotherm model and pseudo-second-order kinetic model fitted the experimental data well, which further demonstrated heterogeneous monolayer adsorption was formed in the adsorption process and the rate controlling step was chemisorption, respectively. The maximum adsorption capacity of DMCPs is 153.85 mg/g. Besides, the regeneration and reusability of DMCPs were also explored. Results showed that more than 80% adsorption capacities of DMCPs for Cr(VI) remained after five adsorption-desorption cycles, verifying that Cr(VI)-loaded DMCPs could be easily separated and efficiently regenerated. Therefore, DMCPs are promising candidates for Cr(VI) adsorption owing to their excellent performance in a wide pH range, easy separation and good reusability.



### Recent Publications

1. Zheng C, Zheng H, Wang Y (2019) Modified magnetic chitosan microparticles as novel superior adsorbents with huge "force field" for capturing food dyes. Journal of Hazardous Materials 367:492-503
2. Zheng C, Zheng H, Wang Y (2018) Synthesis of novel modified magnetic chitosan particles and their adsorption performance toward Cr(VI). Bioresource Technology 267:1-8.
3. Xu B, Zheng C, Zheng H (2017) Polymer-grafted magnetic microspheres for enhanced removal of methylene blue from aqueous solutions. RSC Advances 74:47029-47037.

### Biography

Chaofan Zheng, a second year PhD student at Chongqing University, has several years scientific research experience related to both the water purification and preparation of polymer-grafted biological material with the excellent adsorption performance. After several years' exploration, she has explored a mature method for preparing polymer-grafted magnetic chitosan materials, which is a kind of promising candidates for the removal of heavy metal and dye from wastewater owing to their excellent performance in a wide pH range, easy separation and good reusability.