

15th International Conference on

Environmental Chemistry and Engineering

August 15-16, 2019 | Rome, Italy

Application of magnetic graphene-based composites in the area of water treatment adsorption

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In the recent years, graphene-based composites (GBC) are good candidates of effective adsorbents in water treatment because of their unique physical and chemical properties. However, they usually suffer from serious agglomeration during utilization and difficulties in recycling after adsorption, which limits their application. Thus, the magnetic material is loaded on the GBC to obtain magnetic graphene-based composites (MGBC). MGBC not only combine the excellent adsorption capacity of GBC and easy separation property of magnetic material, but also avoid or decrease the possibility of agglomeration and restacking. MGBC can easy to separate from the treated water using an external magnet. This review concludes the synthesis of MGBC, including co-precipitation method, hydrothermal/ solvent-thermal method, microwave assisted method and ultrasonic chemistry method, highlights adsorption ability for metals and organic pollutants. Then, their mechanisms involving the interaction of MGBC and pollutants are briefly discussed. Finally, prospect for future developments of MGBC in water treatment is proposed. Therefore, MGBC as an excellent adsorbent has bright prospects for applications in water treatment.

Recent Publications

1. 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.
2. 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.
3. Xu B, Zheng H, Zhou H, Wang Y, (2018) Adsorptive removal of anionic dyes by chitosan-based magnetic microspheres with pH-responsive properties. *Journal of Molecular Liquids* 256:424-432.
4. Xu B, Zheng H, Wang Y, (2018) Poly(2-acrylamido-2-methylpropane sulfonic acid) grafted magnetic Chitosan microspheres: Preparation, characterization and dye adsorption. *International Journal of Biological Macromolecules* 112:648-655.

Biography

Wang Yongjuan has extensive experience and theoretical knowledge in the preparation of organic-inorganic polymers, especially in the removal of contaminants from magnetic materials. After many experiments, she explored a mature method for preparing magnetic organic-inorganic polymers, which can be used to treat printing dyeing wastewater and heavy metal wastewater. The polymer has the advantages of low price, simple preparation method, easy separation and recovery, and good Application prospects.