Remediation of Geogenic High Asenic Groundwater using Iron-based Nanomaterial Supported by Monolithic Structure

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Efficient Remediation of High Arsenic Groundwater

Geogenic high arsenic groundwater is one of the global environmental geological disasters, which threatens global human health[1]. At present, Fe-based nanosorbents are being widely considered as an effective remediation materials for contaminated groundwater. However, practical application bottlenecks, such as low removal rate of As(III) and strong tendency to agglomerate, seriously restrict its application scope. In our study, a novel class of material (MFO/MPC), composed of Mn-doped nano FeOOH (MFO) supported on monolithic porous carbon(MPC), is developed for efficient arsenic removal. Unlike conventional nanosized remediation materials, MFO/MPC not only has the bifunctionality of oxidation and adsorption, but also possesses the property of anti-agglomeration, which turned out to be of great potential in the practical use for the remediation of geogenic high arsenic groundwater.

Discussion of Results

This bifunctionality of oxidation and adsorption show its excellent adsorption towards arsenic (maximum adsorption density: 152.5 mg/g for As(V) and 107.3 mg/g for As(III), respectively). At the same time, the kinetics study show that the concentration of As(V) can be reduced to the standard of WHO[2].

[1] Chen, C., *et al*. (2017) *Appl. Surf. Sci.* 425, 423-431.

[2] Habuda, M.& Nujic, M. (2015) *Environ. Sci. Pollut. Res. Int.* 22, 8094-8123.