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PII: S0960-8524(17)30414-5
DOI: http://dx.doi.org/10.1016/j.biortech.2017.03.133
Reference: BITE 17837

To appear in: *Bioresource Technology*

Received Date: 22 January 2017
Revised Date: 21 March 2017
Accepted Date: 22 March 2017

Please cite this article as: Ifthikar, J., Wang, J., Wang, Q., Wang, T., Wang, H., Khan, A., Jawad, A., Sun, T., Jiao, X., Chen, Z., Highly Efficient Lead Distribution by Magnetic Sewage Sludge Biochar: Sorption Mechanisms and Bench Applications, *Bioresource Technology* (2017), doi: http://dx.doi.org/10.1016/j.biortech.2017.03.133

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Abstract

Highly efficient magnetic sewage sludge biochar (MSSBC) discloses feasible fabrication process with lower production cost, superior adsorption capacity, usage of waste sewage sludge as resource, selected by external magnetic field and exceptional regeneration property. 2 g L^{-1} MSSBC exhibited a high adsorption capacity of 249.00 mg g^{-1} in 200 ppm Pb(II) and the lead-MSSBC equilibrium was achieved within one hour, owing to the existence of the copious active sites. The adsorption kinetics was well described by the pseudo-second-order model while the adsorption isotherm could be fitted by Langmuir model. Mechanism study demonstrated the adsorption involved electrostatic attraction, ion exchange, inner-sphere complexation and formation of co-precipitates at the surface of MSSBC. Additionally,