

## MgFe compounds for water purification: the effect of annealing temperature on lead removal performance

Tik Lun Leung<sup>a,\*</sup>, Chun Sing Kam<sup>a</sup>, Qian Sun<sup>a</sup>, Aleksandra B. Djurišić<sup>a</sup>, Mao Hai Xie<sup>a</sup>, Wai Kin Chan<sup>b</sup>, Hang Kong Li<sup>c</sup>, Ying Zhou<sup>c</sup>, Kaimin Shih<sup>c</sup>

<sup>a</sup>Department of Physics, The University of Hong Kong, Pokfulam, Hong Kong, Tel. +85228592528; emails: u3005505@connect.hku.hk (T.L. Leung), kcsj9000@gmail.com (C.S. Kam), lilysqq@gmail.com (Q. Sun), dalek@hku.hk (A.B. Djurišić), mhxie@hku.hk (M.H. Xie)

<sup>b</sup>Department of Chemistry, The University of Hong Kong, Pokfulam, Hong Kong, email: waichan@hku.hk (W.K. Chan)

<sup>c</sup>Department of Civil Engineering, The University of Hong Kong, Pokfulam, Hong Kong, emails: hangkong@connect.hku.hk (H.K. Li), zhouy223@connect.hku.hk (Y. Zhou), kshih@hku.hk (K. Shih)

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### ABSTRACT

Co-precipitation in alkaline solution is a straightforward synthesis method for layered double hydroxide (LDH) materials. Iron-containing LDH materials readily transform to spinel ferrite upon annealing. We prepared MgFe compounds annealed at different temperatures and investigated the effect of annealing temperature on their physical properties and lead adsorption abilities. The co-precipitated samples annealed at 400°C and 600°C exhibited LDH crystal structure, while the samples annealed at 700°C and 800°C had spinel ferrite structure. The maximum lead adsorption capacity reduced with increasing annealing temperature. Transformation from MgFe LDH to spinel ferrite structure after annealing at 600°C leads to the loss of surface area and the elimination of interlayer anions, resulting in a reduction of lead adsorption capacity. Although decreased lead adsorption capacity was found in spinel ferrite sample, magnesium leaching was significantly reduced compared with MgFe LDH samples, indicating enhanced sample stability.

*Keywords:* Layered double hydroxide; Spinel ferrite; Lead removal; Magnesium leaching

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\* Corresponding author.