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Guangsheng Qian, Xiaomin Hu, Liang Li, Linlin Ye, Weijian Lv

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Guangsheng Qian, Xiaomin Hu*, Liang Li, Linlin Ye, Weijian Lv,

School of Resources & Civil Engineering, Northeastern University, Shenyang 110819, P. R. China.

* Corresponding author. Tel.: +86 13940307916. (Xiaomin Hu)

E-mail address: hxmin_jj@163.com

Abstract

This study explored the nitrification mechanism of a periodic reversal bio-electrocoagulation system with Fe electrode. The ammonia nitrogen removal was compared in four identical cylindrical sequencing batch reactors. Two of them were reactors with Fe-C electrodes (S1) and C-C electrodes (S2), respectively. The other two were a reactor with iron ions (S3) and a traditional SBR (S4), respectively. The results demonstrated that the effect on enhancing nitrification in S1 was the best among all four SBRs, followed by S3, S2 and S4. Iron ions increased the biomass, and electric field improved the proton transfer and enzyme activity. The dominant bacterial genera in the four SBRs were *Hyphomicrobium*, *Thauera*, *Nitrobacter*, *Nitrosomonas*, *Paracoccus* and *Hydrogenophaga*. The iron ions may increase the levels of *Nitrosomonas* and *Nitrobacter*, both of which were the main microbes of the nitrification process. This study provided a significant and meaningful understanding of nitrification in a bio-electrocoagulation system.

Keyword: Periodic reversal bio-electrocoagulation system; Enzyme activity; Microbial

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