

Supporting information for

Electrochemical simultaneous denitrification and removing phosphorus
from the effluent of municipal wastewater treatment plant using cheap
metal electrodes

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Figure S1 Effects of electrolyte types on nitrate reduction performance

Figure S2 Effects of electrode spacing on nitrate reduction performance

Figure S3 The images of FESEM for precipitate in the electrocoagulation process

Text S1 Operating cost of simultaneous denitrification and removing phosphorus

Figure S1 Effects of electrolyte type on nitrate reduction performance

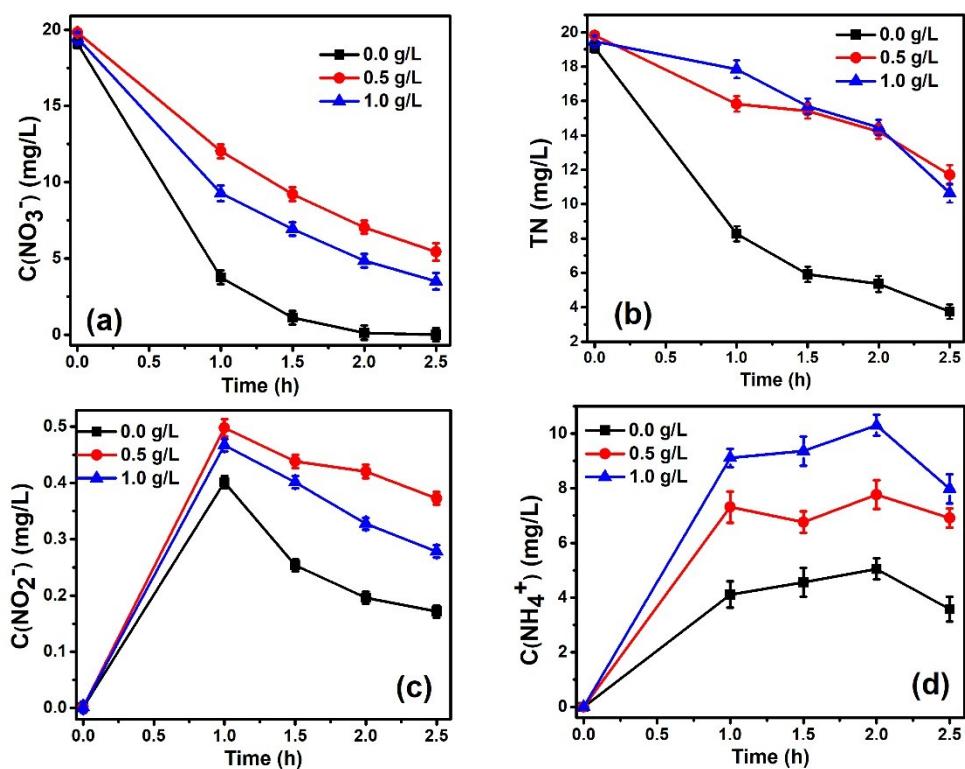


Figure S1(1) Effects of Cl^- concentration on the removal of nitrate and the types of products (nitrite and ammonia) by A (Al) – C (Fe).

(Experimental conditions: $C(\text{NO}_3^-)=20$ mg/L, $t=2.5$ h)

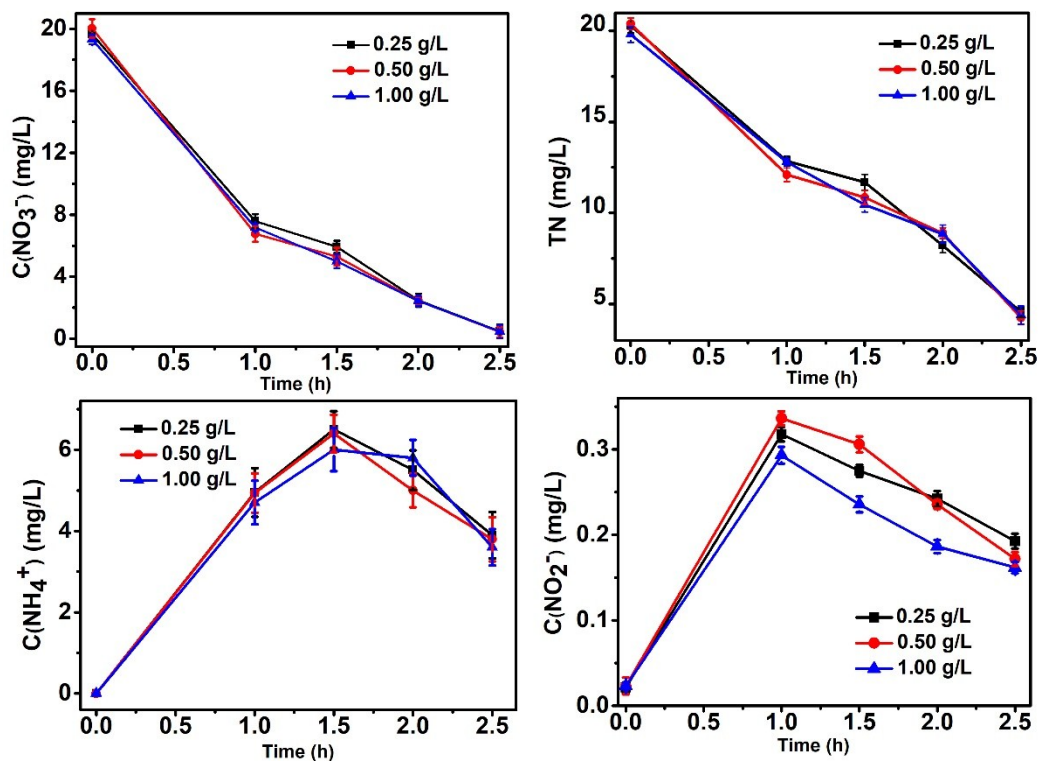


Figure S1(2) Effects of SO_4^{2-} concentration on the removal of nitrate and the types of products (nitrite and ammonia) by A (Al) – C (Fe).

(Experimental conditions: $C(\text{NO}_3^-)=20 \text{ mg/L}$, $t=2.5 \text{ h}$)

Figure S2 Effects of electrode spacing on nitrate reduction performance

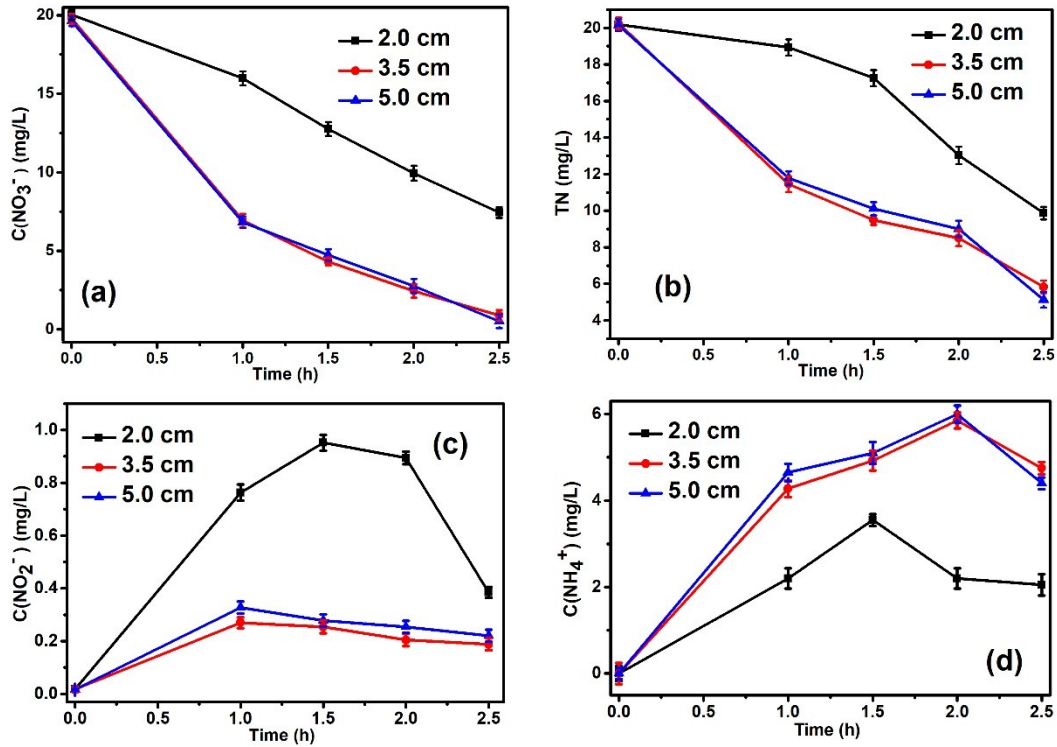


Figure S2 The effects of electrode spacing on the removal of nitrate and the formation of nitrite, ammonia and nitrogen gas.

(Experimental conditions: $C(\text{NO}_3^-)=20 \text{ mg/L}$, $A=1 \text{ mA/cm}^2$, $t=2.5 \text{ h}$).

Figure S3 The images of FESEM for precipitate in the electrocoagulation process

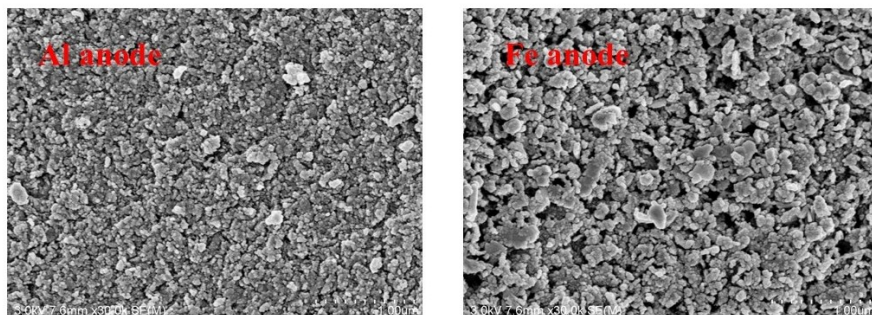


Figure S3 The images of FESEM for precipitate in the electrocoagulation process

Text S1 Operating cost of simultaneous denitrification and removing phosphorus

The cell voltage between Al electrodes was measured to be 4.8 V when the current density was 8 mA/cm². According to the conclusions obtained in 3.5, it was calculated through equation (18) and equation (19) that the energy consumption of removing nitrogen and phosphorus removal by electrolysis of actual wastewater at 8 mA/cm² with aluminum electrodes in 1.5 h was 0.54 KWh/m³ and the electrode consumption was 0.105 g/ m³. According to equation (18), the electricity consumption of electrocatalytic reaction is inversely proportional to the volume of waste water. In the experiment, only 400mL of wastewater could be discharged in the self-made electrolyzer, so the calculated power consumption is relatively high. It is inferred that if the volume of wastewater increased, the power consumption will be reduced.