Deammonification of Wastewater through Ammonia Electrolysis

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Introduction

Nowadays, the development of energy-efficient processes for the treatment of wastewater is becoming an essential research field [1]; taking into account the projected global population rise (over 9 million by 2050 [2]), the depletion of fresh water, and the necessity for available and renewable sources of energy. Within this context the presence of organic compounds and nutrients in wastewater has inspired researchers to work on the development and implementation of electrochemical remediation processes, such as ammonia electrolysis [3].

Objective

It was been reported that the ammonia electrolysis process has the capability to remove above 80% of the ammonia in a single-pass process (Figure 1), consuming less energy than the conventional methods for ammonia removal (i.e. nitrification-denitrification) [4], and co-generating fuel grade hydrogen with an estimated energy consumption of 95% lower than water electrolysis [5,6]

However, the electrolysis could be inefficient if the concentration of ammonia within the wastewater is low. Consequently, this project has focused on increasing the concentration of ammonia to improve the overall efficiency of the process and thus make the technology viable.

Various techniques have been applied to improve the feed concentration while varying the parameters including initial concentration of ammonia and potential. These results will be presented at the meeting.

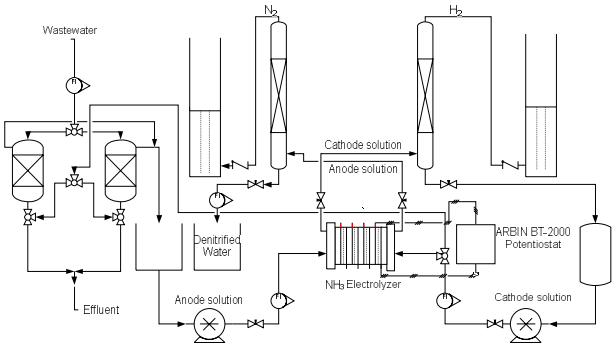

Figure 1 Schematic diagram of wastewater treatment coupled with ammonia electrolyzer

References

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