

## PhD Candidate Profile

**Name:** Rusen Zou

**Research Group (if relevant):** N/A

**Research Centre (if relevant):** N/A



**Department/School(s) (if relevant):** Environment Engineering

**College:** Technical University of Denmark

**Supervisor(s):** Professor, Irimi Angelidaki and Associate professor, Yifeng Zhang

**Funding body:** N/A

**Area (field) of study:** Removal of organic pollutants by bio-electrochemistry system

**Thesis Title:** Scale-up of bio-electro-Fenton system for efficient treatment of azo dyes wastewater

### Abstract:

Wastewater containing high concentration of dyes can cause adverse impacts on the environment and threaten human health. Bio-electro-Fenton (BEF) process has been demonstrated as an effective means for dyes wastewater treatment. However, the scaling-up feasibility of such technology has never been explored. In this study, a scaled-up BEF reactor with total volume of 20 L was developed to treat dyes wastewater. The system was demonstrated to remove dyes from synthetic wastewater efficiently and all tested parameters (cathode pH, cathode air flow rate, cathode  $\text{Fe}^{2+}$  concentration, cathode catholyte concentration, applied voltage, and initial MB concentration) were found to significantly affect the degradation of dyes. Optimum parameter values were found to be pH of 2,  $\text{Fe}^{2+}$  of

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0.2 mM, air flow rate of 350 mL min<sup>-1</sup>, applied voltage of 0.4 V and Na<sub>2</sub>SO<sub>4</sub> of 50 mM. Under optimum operational conditions, the decolorization and mineralization of MB containing wastewater was achieved with apparent first order rate constants of 0.68 and 0.20 h<sup>-1</sup>, respectively. In addition, a continuous operation of the scaled-up system with MB containing wastewater was carried out with hydraulic retention time of 28h, where the 99% of decolorization and 74% of mineralization were attained. This study offers insights into the scaling-up and industrial application of BEF system for wastewater treatment.

**Collaborations:** N/A

**Publications:** N/A

**Presentations:** N/A