

The chancellor of Ghent University has the honour of inviting you to attend the public defense of the doctoral dissertation of

Msc. Rui Gao

Title of the doctoral dissertation:

Electrochemical separation of organics and inorganics from industrial wastewaters

The public defense will take place on Wednesday the 3rd of February 2021 at 15 h via <https://www.fbw.ugent.be/doctorate/RuiGao>. Please select "Listen only" and do not share your video or screen. Questions can be asked via chat after the presentation.

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Abstract of the doctoral research

The co-occurrence of pollutants such as heavy metals, persistent organics, and nutrients results in metal-organics complexes (organometallic complexes), precluding industrial wastewaters' biodegradability and increasing the treatment complexity. Several challenges remained in the conventional treatments such as high energy consumption, high operational cost, chemical additives, and limited separation of organics and inorganics.

Therefore, electrochemical technologies have been developed to achieve separation of organics and inorganics due to various advantages over conventional treatments, include robust, easy to operate, no/fewer chemical additives and flexible in case of variable wastewater sources.

The main aim of this PhD thesis is developing tailored electrochemical technologies following three different target streams to investigate the feasibility of electrochemical systems for separating organics and inorganics from the wastewater water. Simultaneously, the pollutants removal and valued products recovery from wastewaters are also evaluated in this thesis. Three target industrial wastewaters were considered:

- (I) Petrochemical wastewater includes both terephthalic acid (PTA) and cobalt.
- (II) Fertilizer manufacturing wastewater includes ammonium and methanol.
- (III) Alkaline automobile shredder residues (ASRs) leachate includes copper, zinc and ammonium.

The overall applicability of electrochemical technologies for treatment of different stream types has been demonstrated in this thesis, indicating that the process configuration of the electrochemical system can be tailored, offering versatility for various stream types.

Brief Curriculum Vitae

Rui Gao ("Xinjiang, China, January 28th 1992) obtained her bachelor degree in Environmental Engineering, China, in 2014. In 2016, she graduated as Master of Science in Environmental Technology, Environmental Science, at Wageningen University, after which she started her PhD in the framework of the Get-A-Met SBO project, led by VLAIO/SIM (Belgium), which has a final goal to implement an integrated proof-of-concept for the selective recovery of critical raw materials (CRM), and more specifically metals and metalloids contained in industrial wastewaters.

During her PhD, Rui attended U4 Summer School 'Sustainable use and re-use of biomass' September in 2017 and obtained the certification over two weeks workshop. She had the pleasure of supervising an internship student. She successfully obtained three opportunities to present at international conferences and authored several scientific articles published in international peer-reviewed journals.