Department of Materials Science and Engineering Seminar Series 2024

Molten Salt CO_2 Reduction Reaction to Value-added Carbon Nanostructures

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Venue: EA-06-02

Abstract

The electrochemical CO_2 reduction reaction (CO_2RR) embodies a promising strategy to transform CO_2 into fuels and chemical feedstocks. Nevertheless, these products may cause CO_2 re-emission upon combustion, emphasizing the need for CO_2-negative strategies to selectively transform CO_2 into value-added products without re-emission. To this end, the molten salt CO_2RR ($MSCO_2RR$) enables CO_2 transformation into solid-state nanostructured carbons that can be collected easily, stored permanently, and utilized with a low carbon footprint. However, previous reported $MSCO_2RR$-derived carbons, particularly carbon nanotubes (CNTs), have exhibited non-uniform mixtures of carbon morphologies with low selectivity and graphitization degree, limiting applications and commercial viability. Moreover, the graphene synthesis vis MSCO2RR has not been truly realized and comprehensively studied. Here, several advancements were presented to explore and solve the current bottlenecks in the $MSCO_2RR$ field such as the achievement of $MSCO_2RR$-derived CNT growth with high purity (~100%) and high Faradaic efficiency (~80%), and the realization of solution-phase CO_2-electroreduced multilayer graphene growth.

Biography

Yu Fei received his M.Eng. degree from University of Science and Technology of China in 2019. He is currently a Ph.D. candidate under the supervision of Asst. Prof. Andrew Barnabas Wong. His research interests focus on molten salt CO_2 reduction reaction to carbon nanostructures such as CNTs and graphene, and their functional applications.

Please join us!

HOST: Associate Professor Ouyang Jianyong