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HAOTIAN WANG
Associate Professor
RICE UNIVERSITY

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ELECTROCHEMICAL APPROACHES TO DECARBONIZING FUELS AND CHEMICALS

Electrochemical conversion of atmospheric molecules (CO_2 , O_2 , H_2O , N_2) into fuels and chemicals represents a green and alternative route compared to traditional manufacturing approaches. However, its practice is currently challenged at two systematic levels: the lack of active, selective, and stable electrocatalysts for efficient and reliable chemical bond transformations, and the lack of novel catalytic reactors for practical reaction rates and efficient product separation. In this talk, using CO_2 reduction to gas and liquid products and O_2 reduction to hydrogen peroxide as representative reactions, I will introduce the rational design of both catalytic materials and reactors towards practical electrochemical manufacturing of fuels and chemicals.