# Designing electrocatalytic materials for water reactions

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In this presentation, I will discuss the crucial parameters influencing the activity and stability of electrocatalysts in the oxygen reduction reaction (ORR), oxygen evolution reaction (OER) and $CO_2$ reduction reaction (CO2RR). A deep understanding of the fundamental principles governing the behavior of these nanocomposites is essential for advancing the design of high-performance electrocatalysts [1] while minimizing dependence on critical raw materials, such as platinum group metals.
My talk will delve into insights about the structural ordering of Pt-alloy ORR nanoparticles [2], the synthesis and electrochemical characterization of various titanium oxynitride-supported Ir nanoparticles as OER electrocatalysts [3] and the dynamic restructuring of copper $CO_2$RR materials [4]. Furthermore, I will showcase our advanced electrochemical characterization methods, including identical location electron microscopy and online metal dissolution and gas evolution analytics. Through a variety of electrochemical measuring cells, automatization and our feedback loop approach (Figure 1), accelerated improvements in electrocatalyst design can be achieved. Join me as we explore critical perspectives shaping the development of efficient and sustainable electrocatalysts.

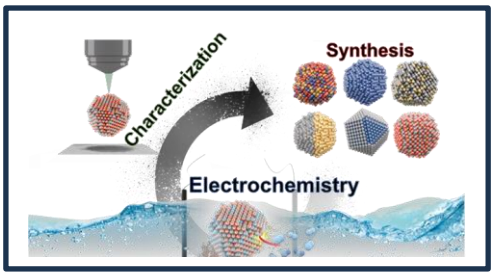


*Figure 1: Schematic representation of the feedback loop in electrocatalyst design.*

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