Tuning the electrocatalytic performance of nanocatalysts via the effect of the support

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Environmental deterioration, climate changes, and occasional geopolitical and economic crises highlight the necessity to accelerating the transition from fossils to green and renewable energy. In that regard, *the hydrogen economy* was proposed half a century ago as a concept to decarbonize global energy system by using hydrogen as the main energy carrier. Electrochemical energy conversion devices, such as water electrolysers (WE) and fuel cells (FC), are able to close the loop between carbon-free production and utilization of hydrogen. Therefore, the studies of electrocatalytic processes involved in WEs and FCs are at the forefront of the research that drives the transition to green hydrogen energy.

Modern electrocatalysts for WEs and FCs are comprised of two main components: nanoparticles of platinum group metals (PGM) and high-surface area carbon supports. Traditionally, enhancement of the electrocatalytic performance of these composites is achieved by tuning the properties of PGM nanoparticles as the active sites where reactions enroll. In this talk, I will present a different approach, in which alternative support materials instead of carbon can be used to enhance the overall performance of supported Pt for electrochemical reactions that take place in FCs and WEs.