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High performance catalysts for hydrogen and oxygen evolution reactions and water electrolysis

Water electrolysis for hydrogen production is very important but not efficient due to high cost of the noble metal containing catalysts or low performance of the non noble metal based catalysts. Water electrolysis involves hydrogen evolution reaction (HER) and oxygen evolution reaction (OER). HER catalysts are normally good only in acid and OER catalysts only in base, but none of them are good in both acid and base or bi-functional for both HER and OER, which makes the overall water electrolysis not efficient. We recently discovered some catalysts better than the noble metal containing ones in both acid and base, which made the overall water electrolysis more efficient than the noble metal containing catalysts. In this talk, the author will present a few examples on their recent discovery on new catalysts to achieve water splitting for current density larger than 500 mA/cm² at less than 1.7 V.

Biography

Zhifeng Ren is currently the M.D. Anderson Chair Professor in the Department of Physics and TcSUH of the University of Houston. He obtained Ph.D. degree from the Institute of Physics Chinese Academy of Sciences in 1990, specializes in materials synthesis and applications, especially in nanostructured thermoelectric materials, devices, and systems for more efficient energy conversion using the enhanced thermoelectric materials. He is a fellow of APS and AAAS. He has published more than 270 papers with a total citation of 15,000 and an H-index of 57. He is ranked at 49th of the materials scientists in the world.

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