# Nanoheterostructures for Electrochemical Water Splitting

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**Abstract**:

Electrochemical splitting of water is one of the key technological components of hydrogen economy. In an electrolysis cell, although the hydrogen evolution reaction (HER) at the cathode is the major reaction of interest, the anodic oxygen evolution reaction (OER) is the most energy intensive step since the efficiency of water electrolysis is limited by the large anodic overpotential of OER. A cost-efficient catalyst able to work at low overpotential for optimized energy conversion also needs to be stable to air, light, water, heat and oxidative deactivation.

Among several metal, metal oxide, non-metal and heterogeneous catalysts available in the literature, our major focus is to develop nanoheterostructured catalysts both for OER and HER, thereby leading to overall water splitting. This lecture will focus on the alloy and oxide heterostructures. The key factors of a suitable catalyst namely a tuneable chemical composition via doping strategies, morphology, high electrical conductivity, decent porosity and electrochemically active surface area will be discussed. Among the substrate scopes, common-paper based flexible electrodes with extreme mechanical stability for efficient overall water splitting will be highlighted.