

High Entropy Alloys as Electrocatalyst for Hydrogen Evolution Reaction: A Critical Review

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Abstract

Green Hydrogen is carbon free, renewable and highly popular to achieve the goal of decarbonizing the planet. The challenges that are widely faced are its production technology, electrocatalyst used and technology influenced commercial prospects including cost of hydrogen synthesis. Electrocatalysts make the focal point of the research for hydrogen production by water splitting mechanism. There are various challenges to overcome in an electrocatalyst such as to improve the catalytic performance, improve electron transfer efficiency, increase the energy harvesting capability and ensure stability. Noble electrodes such as Pt, Pd and Ir are widely used for this purpose but to make it cost effective, nanostructured electrodes are being researched because of its huge operational surface area, thus increasing the efficiency of electrode. High Entropy Alloys have emerged the significant alloys that have high entropy, tunable bandgaps and hardness and are assumed to mimic the noble metal catalyst like Platinum. High Entropy alloys used as electrocatalyst in water splitting for green hydrogen production is a recent and emerging source. The purpose is to minimize the use of noble metals and thus cut the hydrogen production cost with increased durability for commercial purpose. This article is a researched review describing various synthesis methods of high entropy alloy used as an electrocatalyst for water splitting for HER.

Keywords: Green Hydrogen, High Entropy alloys, Noble electrocatalyst, water splitting