ABSTRACT:

Electrocatalytically active materials are needed to create energy and turn it into a form that can be stored. The current energy problems highlight the critical necessity for continued development of renewable energy sources to properly satisfy the world's energy demands. The fuel must be affordable, ecologically benign, and simple to store in addition to being repeatable and sustainable. Scientists are now investigating energy storage in the form of hydrogen chemical bonds as it is the only energy production technique that is least expensive and emits no carbon dioxide. The most sophisticated electrocatalysts for the OER and HER of electrochemical water splitting are widely considered to be the noble metals Pt, Pd, Ru, and Ir, as well as their oxides. These noble metals have not been utilized as electrocatalysts on a large scale due to their expensive cost and restricted availability. As a result, analogs of transition metals with comparable catalytic activity are replacing these noble metals. Cobalt (Co), molybdenum (Mo), iron (Fe), nickel (Ni), and copper (Cu) pnictides and chalcogenides act as electrocatalysts to separate water during electrolysis. But in order to create these metal chalcogenides, researchers need a range of brainteasers. In this study, a simple hydrothermal synthesis technique is used to reduce the cost of generating electrocatalysts. In addition to other techniques, chronoamperometry, FTIR, SEM, CV, EIS, and electrochemical examinations were performed to characterize the materials. Electrochemical studies were performed to evaluate the composite ZnCdTe capacity to catalyze the splitting of water. Zinc cadmium telluride, on the other hand, demonstrated an improbable high catalytic efficiency and was demonstrated to be extraordinarily active toward the whole water splitting process with long-term durability. For the oxidation of water, it was found that the ZnCdTe combination was exceptionally active and stable. Because of this, the catalysts may be employed often in industrial testing, leading to an increase in the global production of renewable energy.