# $MoS_2/CNT/Ti_3C_2Tx$ ternary nanohybrid for low-overpotential electrocatalytic hydrogen evolution

**Shilpa R**[1]
Sophy Mariam Varghese[2,3], Rakhi R. B.[2,3]*

*[1]Centre for Sustainable Energy Technologies, CSIR- National Institute for Interdisciplinary Science and Technology (CSIR-NIIST), TVM, Research Centre University of Kerala, Kerala, India, 695019*
*[2]Centre for Sustainable Energy Technologies (C-SET), CSIR-National Institute for Interdisciplinary Science and Technology, Industrial Estate, Thiruvananthapuram - 695 019, Kerala, India*
*[3]Academy of Scientific and Innovative Research (AcSIR), Ghaziabad- 201002, India*

*Email: shilparkrishnan6@gmail.com, **rakhirb.niist@csir.res.in

Abstract

The demand for sustainable energy and the shift towards decarbonisation is increasing at an alarming rate over the past decades. Development of efficient electrocatalyst materials for the generation hydrogen through water splitting is a solace to this concern.[1] This study discusses the design and synthesis of an optimised combination of $MoS_2/CNT/Ti_3C_2T_x$ for low-overpotential electrocatalytic hydrogen evolution reaction (HER). $Ti_3C_2T_x$ MXenes were synthesised by chemical etching. $MoS_2/Ti_3C_2T_x$ at different ratios was synthesised through ultrasonication. $MoS_2$/CNT at different ratios were synthesized through hydrothermal method. Upon identifying the best performing combinations an optimised $MoS_2/CNT/Ti_3C_2T_x$ was synthesised. The ternary nanomaterial was able to deliver hydrogen evolution at lower potential of 130 mV with a n enhanced kinetics indicated by the lower Tafel slope of 150 mV/dec. Moreover, the material demonstrated excellent stability for about 24 hours. The enhanced performance of the ternary nanomaterial can be attributed to the optimised design ratios adopted and the synergistic effect of individual components.[2]

References

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