

Students' Annual Seminar

Role of Atomically Thin Layers in Electrocatalytic Hydrogen Evolution Reaction

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Platinum (Pt) and Molybdenum disulphide (MoS_2) have been recognised for their significant electrocatalytic activity in the Hydrogen Evolution Reaction (HER). However, the persistent challenge of Pt dissolution poses a considerable obstacle to the prolonged utilisation of Pt catalysts in acidic or alkaline environments, in addition to Pt's expensiveness. The catalytically inactive large area covered basal plane in MoS_2 limits as a kinetic obstacle. To address these issues, we have devised a few novel catalyst systems for catalysis, for HER in particular. In one such case, hexagonal boron nitride (hBN) is used as a chemically stable platform for charged Pt catalytic centres and an extremely low Pt content hBN based catalyst for HER is developed. It is shown for its high intrinsic activity and stability. Further studies are in progress to unravel the mechanism for heterogeneous electron transfer in these systems. Similarly, vertical MoS_2 structures were realised using a simple and scalable approach and they are named as MoS_2 nanowalls. These nanowalls show high HER catalytic activity and also usability in extreme pH conditions in long term electrolysis. The results will be discussed during the presentation and also our future plans on these lines of research.

Tuesday, Mar 12th 2024

14:00 Hrs (Tea / Coffee 13:45 Hrs)

Seminar Hall, TIFR-H