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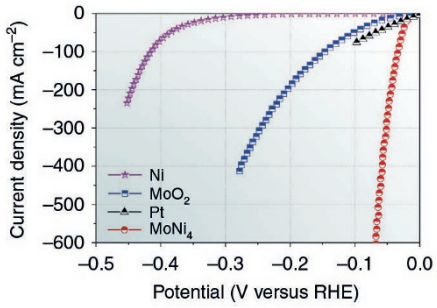
IN BRIEF

HETEROGENEOUS CATALYSIS

Nanoparticle catalysts find a nice home in a foam



The combustion of fossil fuels can, in principle, be eschewed if we can efficiently electrolyse water into hydrogen and oxygen. In practice, the formation of hydrogen is typically catalysed by platinum electrodes, which have rapid water dissociation kinetics and operate through mechanisms with minimal energy barriers. However, the scarcity of platinum prohibits the construction of the terawatt-scale devices needed to shoulder the global energy demand. In view of this, Xinliang Feng and co-workers describe in *Nature Communications* a new molybdenum–nickel ($MoNi_4$) nanoparticle system supported on molybdenum oxide microparticles, which, in turn, are embedded in a highly porous nickel foam. The high proton reduction performance of the composite catalyst in alkaline media rivals that of platinum, with the base metal catalyst operating at an onset potential of 0 mV. Moreover, it requires an overpotential of only 15 mV to give the 10 mAcm^{-2} benchmark current density, making it one of the most active, yet stable, platinum-free catalysts for hydrogen evolution.

Feng's team find that the hydrogen adsorption (Volmer) mechanistic step is particularly fast on the active sites of the $MoNi_4$ surfaces. Furthermore, the material can be produced on a 6 cm × 20 cm scale, such that its industrial-scale development is not inconceivable. Although such a scale-up will take time, this work is an encouraging step in the preparation of active and robust base metal catalysts.

Adam Weingarten, Associate Editor, Nature Communications

ORIGINAL ARTICLE Zhang, J. et al. Efficient hydrogen production on $MoNi_4$ electrocatalysts with fast water dissociation kinetics. *Nat. Commun.* **8**, 15437 (2017)