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COST-EFFECTIVE ELECTROCATALYST COATINGS FOR ROOM TEMPERATURE ALKALINE ELECTROLYSIS

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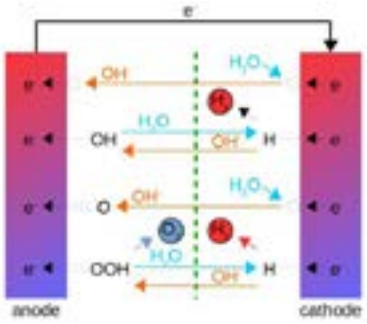
Developing high-performance electrode coatings for water-splitting under room temperature alkaline conditions remains of paramount importance as a means of storing excess renewable energy as hydrogen gas. 316 grade stainless steel has already proven itself to be an extremely practical choice of electrode material in its own right, but would nevertheless benefit from functional coatings to increase both its activity and lifetime, especially at the cathode for the hydrogen evolution reaction. Titanium nitride deposited via physical vapour deposition has therefore been investigated as a commercially available coating that shows some promise for cathodic lifetime extension, albeit with slightly reduced activity. Similarly a facile, electro-deposited Raney nickel coating has been investigated that shows greatly enhanced catalytic activity, with results that equal or exceed many recently published results for much more complex bifunctional electrocatalysts. The Raney nickel also exhibits extremely satisfactory stability, surviving many thousands of current cycles in accelerated ageing tests. The ultimate aim is to develop practical and highly active electrode materials with which to equip future smart energy grids.



Biography

William J F Gannon is a second year PhD student, studying at the new Energy Safety Research Institute at Swansea University. He is currently the recipient of a prestigious Zienkiewicz Scholarship, and the holder of a 1st class Master degree from Oxford University. His previous non-academic experience includes developing electronics for the large hadron collider in CERN, and for the Rosetta Spacecraft mission.

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