Development of a non-Pt Anode catalyst for Alkaline Anion Exchange Membrane Fuel Cells

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With the high cost and limited availability of platinum, much effort has gone into the reduction of catalyst loadings in fuel cell electrodes. Platinum is the most effective catalyst for both the hydrogen oxidation reaction (HOR) and the oxygen reduction reaction (ORR) in acidic polymer electrolyte fuel cells (PEM), but the vastly improved kinetics of the ORR in an alkaline medium opens up the possibility of utilizing cheaper catalysts for alkaline anion exchange membrane fuel cells (AAEM).

However, in the alkaline environment, the kinetics of the HOR are an order of magnitude slower on Pt than in acid (though Pt remains the best catalyst in both media). Therefore, in order to take advantage of the more facile ORR kinetics in alkaline, anode catalyst development and cost reduction is required. Anode catalyst development is often overlooked but is necessary for commercial realisation of AAEM fuel cells.

Rotating disk electrode (RDE) studies, along with *in situ* fuel cell testing, have shown a novel, high-efficiency low cost catalyst to have activation properties matching that of Pt, when used in alkaline conditions. The performance of the low cost catalyst in an AAEM is also similar to that of an AAEM made using commercially available Pt electrodes, suggesting a potential route for future reduction of cost and platinum use in fuel cell electrodes.