

The synthesis of PdPt/carbon paper via surface limited redox replacement reactions for oxygen reduction reaction

Rapelang G. Motsoeneng ^a, Remegia M. Modibedi ^{b,*}, Mkhulu K. Mathe ^b,
Lindiwe E. Khotseng ^a, Kenneth I. Ozoemena ^b

^a Faculty of Natural Science, University of the Western Cape, Bellville, Cape Town 7535, South Africa

^b Materials Science and Manufacturing, Council for Scientific & Industrial Research (CSIR), Pretoria 0001, South Africa

Abstract

Surface-limited redox replacement reactions using the electrochemical atomic layer deposition (EC-ALD) technique were used to synthesize PdPt bimetallic electrocatalysts on carbon paper substrate. Electrocatalysts having different Pd:Pt ratio were electrodeposited by varying the deposition cycles of Pd and Pt. Diverse structural shapes of PdPt electrocatalysts were obtained with scanning electron microscopy (SEM). Higher number of deposition cycle produced more agglomerates and less dense particles on the support surface. The EDX profiles confirmed the presence of Pd and Pt particles on carbon paper. Cyclic voltammograms (CV) and linear scanning voltammetry (LSV) in oxygen showed that the electrodeposited catalysts were active for ORR and some were less affected by the methanol introduced in the vessel.