

PLATINUM PHOTO-DEPOSITED ON SnO₂-C NANOCOMPOSITES FOR IMPROVED ORR ACTIVITY AND LONG-TERM DURABILITY

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It has been reported earlier that metal oxide-carbon composite support increases lifetime of the Pt electrocatalysts used for the oxygen reduction reaction (ORR) in proton-exchange membrane fuel cell (PEMFC) [1]. In the present work, Pt nanoparticles (NPs) are photo-deposited onto SnO₂-C nanocomposites. Electrochemical characterization of the prepared catalysts is carried out by cyclic voltammetry (CV) and CO-oxidation experiments performed in 0.1 M HClO₄ solution. The ORR electrocatalytic activity and durability of the prepared catalysts is compared to that of the Pt/C catalyst. It is revealed that Pt photo-deposited onto SnO₂-C nanocomposites is more durable than Pt/C because of the strong anchoring mechanism of the Pt NPs to the metal oxide induced by photons of appropriate wavelength.

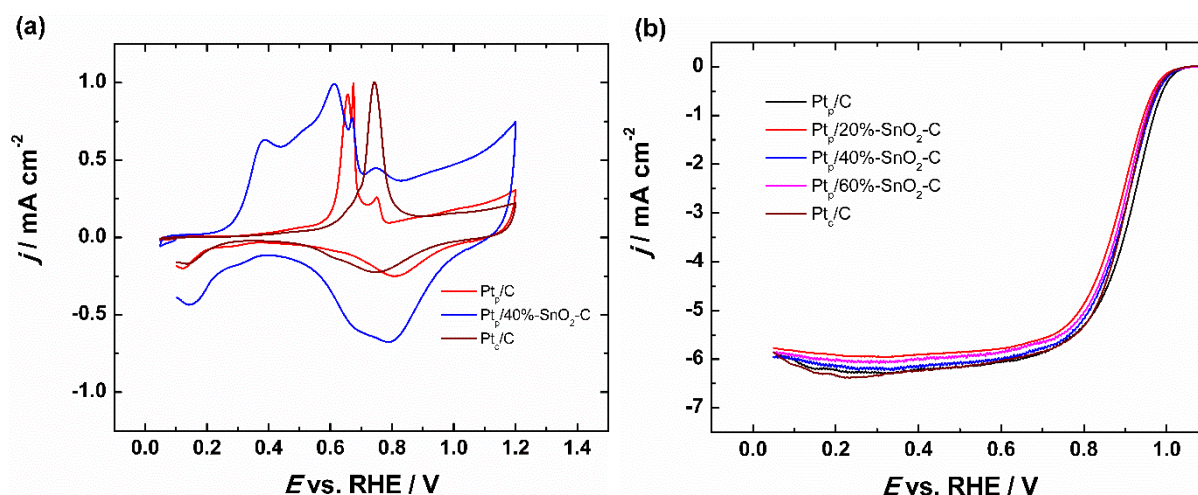


Figure. CO-oxidation profiles of Pt-SnO₂-C catalysts in comparison to Pt/C (a) and RDE polarization curves for ORR at 1600 rpm in oxygen-saturated 0.1 M HClO₄ solution (b).

References

[1] L.A. Estudillo-Wong, Y. Luo, J.A. Díaz-Real, N. Alonso-Vante, Appl. Catal. B: Environ. 187 (Supplement C) (2016) 291-300.