Effect of carbon nanodots supported palladium-based electrocatalysts towards oxygen reduction reaction in an alkaline medium

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Carbon nanodots (CNDs) have been synthesised using a simple and cheap pyrolysis method. The Pd/CNDs electrocatalyst was synthesised by the in-situ reduction method. The calculated particle sizes were found to be 6.0 nm and 0.974 nm for CNDs and Pd nanoparticles, respectively. The reaction kinetics of the Pd/CNDs was found to have an onset potential of -0.111 V, which is 0.052 V lower than that of Pd/C. CNDs are good electrocatalysts support, as supported by durability and stability studies. The electrocatalyst showed improved durability and stability when CNDs were used as the support material for the Pd nanoparticles.

Keywords: carbon nanodots, electro-catalysis, oxygen reduction reaction, electrode, fuel cells

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