Electrochemical Performance of the Pd/C Catalyst Synthesized by Polyol Process

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A polyol process is employed to synthesize Pd nanoparticles supported on carbon (Pd/C), for developing an electrocatalyst with excellent performance for methanol oxidation. The results show that this method has a high efficiency for the Pd nanoparticles depositing on the carbon support. Moreover, the average diameter of the Pd nanoparticles decreases with the amount of KOH solution employed during the catalyst synthesis. The highest electrochemical activity of the Pd/C catalyst for the methanol oxidation in 0.1 M KOH solution with 1.0 M methanol at 25 °C reaches to 447.4 mA mg⁻¹ Pd. The activity difference between the Pd/C catalysts prepared at 200 (447.4 mA mg⁻¹ Pd) and 180 °C (435.8 mA mg⁻¹ Pd) for the methanol electrooxidation is very small, showing that the polyol process is suitable for the preparation of the Pd/C.

Keywords: Direct methanol fuel cells (DMFCs), Pd nanoparticles, Methanol electrooxidation, Electrocatalysis, Nanomaterials

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