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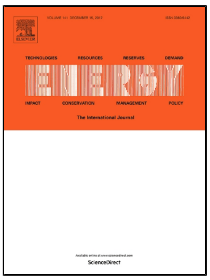

Effect of Template, Reaction Time, and Platinum Concentration in the Synthesis of PtCu/CNT Catalyst for PEMFC Applications

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PII:	S0360-5442(18)30087-2
DOI:	10.1016/j.energy.2018.01.069
Reference:	EGY 12181
To appear in:	*Energy*
Received Date:	14 September 2017
Revised Date:	07 January 2018
Accepted Date:	12 January 2018

Please cite this article as: Yazmín Y. Rivera-Lugo, Moisés I. Salazar-Gastélum, Deisly M. López-Rosas, Edgar A. Reynoso-Soto, Sergio Pérez-Sicairos, Samgopiraj Velraj, José R. Flores-Hernández, Rosa M. Félix-Navarro, Effect of Template, Reaction Time, and Platinum Concentration in the Synthesis of PtCu/CNT Catalyst for PEMFC Applications, *Energy* (2018), doi: 10.1016/j.energy.2018.01.069

Effect of Template, Reaction Time, and Platinum Concentration in the Synthesis of PtCu/CNT Catalyst for PEMFC Applications.

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Keywords

Galvanic Displacement; Hydrogen Fuel Cell; Oxygen Reduction Reaction; Catalyst; Template.

Abstract

Ultra-low PtCu loading on carbon nanotubes (CNT) catalysts were synthesized by a novel galvanic displacement (GD) method under sonication conditions. The influence of the type of copper template, reaction time, and Pt concentration in the galvanic displacement bath and their correlation to electrocatalytic activity of the catalysts for oxygen reduction reaction in acidic media were studied. Among the catalysts synthesized, the best catalyst identified through electrochemical analysis was used to prepare Membrane Electrode Assembly and evaluated in a hydrogen fuel cell. The maximum power density of the PtCu/CNT and commercial catalyst (20% Pt/C) in the fuel cell were 452 mW cm^{-2} at 0.424 V and 358 mW cm^{-2} at 0.475 V, respectively, clearly showing the superior electrocatalytic capability of the PtCu/CNT catalyst synthesized in this study when compared with the commercial catalyst.