

High quantum efficiency Pt/TiO₂ catalyst for sacrificial water reduction

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Received 27 January 2006; received in revised form 18 April 2006; accepted 1 May 2006

Available online 11 July 2006

Abstract

Platinum photodeposition on TiO₂ from methanolic solution of chloroplatinic acid (CPA) is investigated to determine the conditions that give optimum photocatalytic activity towards dehydrogenation of methanol. Conditions favoring nucleation of Pt islets rather than their autocatalytic growth enhance the catalytic activity. Photoplatinization from idoplatinic acid, adsorbing more strongly on TiO₂ than CPA produced more active Pt/TiO₂ catalysts. The best catalyst prepared from CPA yielded H₂ from 12.5% methanol solution at a quantum efficiency of 23.9% whereas for idoplatinic acid based catalysts, the quantum efficiency increased to 42.5%.

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Keywords: TiO₂; Pt/TiO₂; Water reduction; Photocatalyst; Photodeposition
