

Abd El Maksod, I.H.^{a d}, Hegazy, E.Z.^{a d}, Kenawy, S.H.^b, Saleh, T.S.^c

An environmentally benign, highly efficient catalytic reduction of p-Nitrophenol using a nano-sized nickel catalyst supported on silica-alumina

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^a Physical Chemistry Department, National Research Centre Dokki, El Behouth Street, Dokki, Cairo 12622, Egypt

^b Ceramic Department, National Research Centre Dokki, El Behouth Street, Dokki, Cairo 12622, Egypt

^c Green Chemistry Department, National Research Centre, Dokki, El Behouth Street, Dokki, Cairo 12622, Egypt

^d Chemistry Department, Faculty of Science, King Abdul Aziz Univesity, Jeddah 21533, Saudi Arabia

Abstract

A green and effective method is reported for the reduction of p-nitrophenol to p-aminophenol using a nano-sized nickel catalyst supported on silica-alumina in the presence of hydrazine hydrate as an alternative source of hydrogen. It was found that nickel loaded on a silica-alumina support is a very effective catalyst in the hydrogenation of p-nitrophenol to p-aminophenol. Thus it attained 100% conversion in only 69 seconds instead of 260 seconds for commercial Raney nickel. In addition, the possibility to reuse it more than one time with great efficiency gives it another advantage over commercial Rainey nickel which cannot be used more than once. This economical and environmentally friendly method provides a potentially new approach for the synthesis of the intermediate product of paracetamol in industry, which overcomes the drawbacks of the known reduction methods. The prepared catalysts were fully characterized by X-ray diffraction (XRD), scanning electron microscopy (SEM), energy dispersive X-ray (EDX), and electron spin resonance (ESR) techniques. © 2010 Wiley-VCH Verlag GmbH & Co. KGaA.

Author Keywords

Catalytic activity; Electron spin resonance (ESR); Nano-sized nickel catalyst; P-aminophenol; Scanning electron microscopy (SEM); X-ray diffraction (XRD)

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