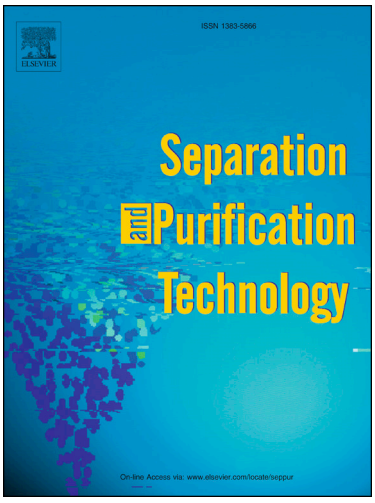

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Green synthesis of Pd/Fe_3O_4 nanocomposite using *Hibiscus tiliaceus* L. extract and its application for reductive catalysis of Cr(VI) and nitro compounds

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ABSTRACT

During this paper, palladium nanoparticles were immobilized on the surface of Fe_3O_4 using *Hibiscus tiliaceus* L. extract as a stabilizing and reducing agent. The green synthesized Pd/Fe_3O_4 nanocomposite was characterized by FT-IR, UV-Vis, TEM, XRD, VSM, FESEM and EDS. The prepared Pd/Fe_3O_4 nanocomposite was used an efficient catalyst for the reduction of Cr(VI), 4-nitrophenol (4-NP) and 2,4-dinitrophenylhydrazine (2,4-DNPH). The catalytic activities of the Pd/Fe_3O_4 nanocomposite in reactions were monitored by using UV-Vis spectroscopy. It can be recovered and reused six times without remarkable loss of its catalytic activity.

Keywords: Green synthesis; Pd/Fe_3O_4 nanocomposite; *Hibiscus tiliaceus* L. extract; eco-friendly; reduction of Cr(VI) and nitro compounds

1. Introduction

Cr(VI) and nitroarene compounds are well known as toxic, carcinogenic and bio-refractory pollutants in wastewaters. Therefore, it is necessary to find the efficient approaches to remove these contaminants [1,5].

Hexavalent chromium (Cr(VI)) is one of the most abundant heavy metal pollutants in wastewater which is very dangerous and toxic [6]. Therefore, despite being soluble in water, its removal has become one of the most important concerns of scientists [7]. The simplest method to remove Cr(VI) includes its conversion to trivalent chromium (Cr(III)). The Cr(III) has low toxicity which easily eliminated due to the formation of insoluble hydroxides by adjusting the pH in aqueous media [8]. Over the past few years, various reducing agents such as iron salts and sulfur compounds have been used to reduction of Cr(VI). The use of these compounds was

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