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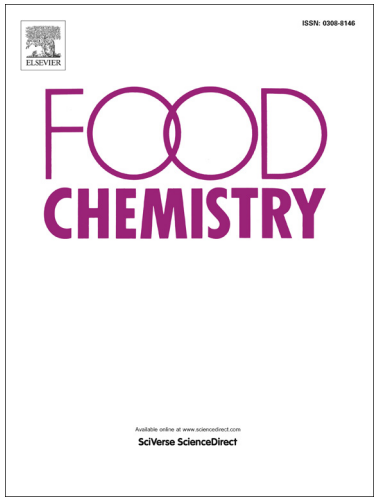

Synthesis of $Fe_3O_4@SiO_2@OSi(CH_2)_3NHRN(CH_2PPh_2)_2PdCl_2$ Type Nanocomposite Complexes: Highly Efficient and Magnetically-Recoverable Catalysts for Vitamin K_3 Synthesis

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Synthesis of $Fe_3O_4@SiO_2@OSi(CH_2)_3NHRN(CH_2PPh_2)_2PdCl_2$ Type Nanocomposite Complexes: Highly Efficient and Magnetically-Recoverable Catalysts for Vitamin K_3 Synthesis

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Abstract

The synthesis of aminomethylphosphine-metal complexes have opened a new perspective to the catalytic applications of organic compounds. Magnetic Fe_3O_4 nano-core was synthesized using the closed quartz tube with teflon cover and microwaved 200°C for 1 h with power controlled instrument set to max. 600 watt. Novel nano-composite supported; $Fe_3O_4@SiO_2(CH_2)_3NHArN(CH_2PPh_2)_2$ and $Fe_3O_4@SiO_2(CH_2)_3N(CH_2PPh_2)_2$ type *bis*(diphenylphosphinomethyl)amino ligands and their Pd(II) complexes have been synthesized and characterized with FT-IR, SEM, EDX, TEM, UV-Visible, XRD and TG/DTA techniques. All the complexes were used as heterogeneous catalysts in the oxidation of 2-methyl naphthalene (2MN) to 2-methyl-1, 4-naphthoquinone (Vitamin K_3, menadione, 2MNQ) in the presence of hydrogen peroxide and acetic acid. Selectivity reached about 55-60 % with a conversion of 90-96 % using the nano-magnetite supported aminomethylphosphine-Pd(II) complexes. The complexes were very active in three times in the catalytic recycling experiments in five catalytic cycles.

Keywords: Phosphine, aminophosphine, Fe_3O_4, nano, palladium, catalyst, vitamin k, menadione.

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