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ACCEPTED MANUSCRIPT

Fe_3O_4/SiO_2 nanoparticles coated with polydopamine as a novel magnetite reductant and stabilizer sorbent for palladium ions: Synthetic application of Fe_3O_4/SiO_2@PDA/Pd for reduction of 4-nitrophenol and Suzuki reactions

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Graphical abstract

Fe_3O_4/SiO_2 nanoparticles coated with polydopamine as a novel magnetite reductant and stabilizer sorbent for palladium ions: Synthetic application of Fe_3O_4/SiO_2@PDA/Pd for reduction of 4-nitrophenol and Suzuki reactions

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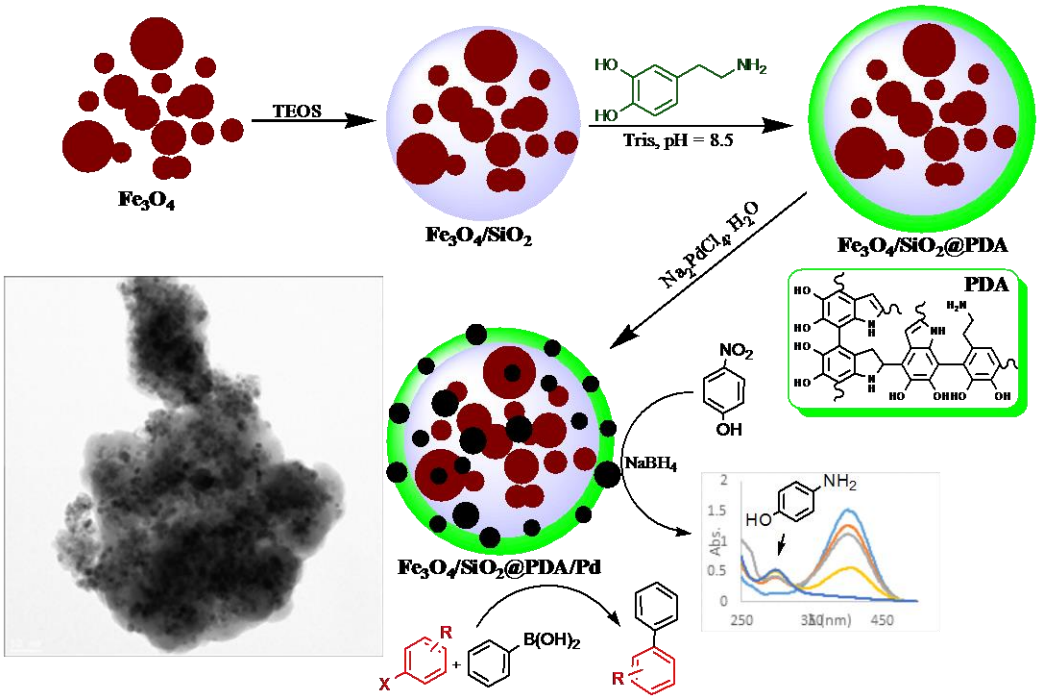

Abstract. Polydopamine (PDA)-coated Fe_3O_4/SiO_2 nanoparticles (Fe_3O_4/SiO_2@PDA) were synthesized through a simple and green procedure. In this study, for the first time, successful deposition of Pd nanoparticles is described by using Fe_3O_4/SiO_2@PDA as a magnetic reducing and stabilizing agent. In this approach, palladium ions were adsorbed on Fe_3O_4/SiO_2@PDA surfaces by immersing the PDA-coated Fe_3O_4/SiO_2 nanoparticles into a palladium plating bath. Then, they were reduced in situ to palladium nanoparticles by the help of PDA's N-containing groups and reducing ability. The structure, morphology and physicochemical properties of the synthesized particles were characterized by different analytical techniques such as high resolution transmission electron microscopy (HRTEM), field emission scanning electron microscope (FESEM), energy-dispersive X-ray spectroscopy (EDS), wavelength-dispersive X-ray spectroscopy (WDX), X-ray diffraction analysis (XRD), vibrating sample magnetometer (VSM), X-ray photoelectron spectroscopy (XPS), inductively coupled plasma (ICP) and FT-IR spectroscopy. Fe_3O_4/SiO_2@PDA/Pd nanoparticles illustrated high catalytic activity as a

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