Microwave-assisted selective oxidation of benzyl alcohol using low loaded supported iron oxide nanoparticles on Al-MCM-41

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Supported Fe oxide nanoparticles on Al-MCM-41 (Fe/Al-MCM-41) materials were synthesized via microwave-assisted deposition of the oxide nanoparticles on the surface of Al-MCM-41 as supports. Materials were characterized by adsorption of pyridine (PY), X-Ray Diffraction (XRD), Transmission Electron Microscopy (TEM), X-Ray Photoelectron Spectroscopy (XPS) and N_2 physisorption and their activity was subsequently investigated in the microwave-assisted oxidation of benzyl alcohol using H_2O_2 as green oxidant. Catalysts, containing low Fe loadings (typically 0.5-1 wt.%) were found to be highly active, selective and reusable in the oxidation of benzyl alcohol with remarkably improved conversions of starting material under microwave irradiation, reducing also times of reaction from 72h+ to a few minutes. Activities found in the reaction constitute the first example of greener microwave efficient Fe-catalysed protocols for the oxidation of aromatic alcohols using H_2O_2 as green oxidant.

Keywords: Fe/Al-MCM-41, supported iron oxide nanoparticles, microwaves, oxidation of benzyl alcohol.