Preparation and characterisation of Preyssler heteropolyacid-cellulose acetate hybrid nanofibers: a new, green and recyclable nanocatalyst for photodegradation of methyl orange as the model dye

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Abstract

For the first time, sodium 30-tungstopentaphosphate, a green and efficient solid acid, was used for the isolation of cellulose from rice husk, resulting in the generation of Preyssler heteropolyacid-cellulose acetate hybrid nanofibers. These modified fibres were characterised by Fourier transform infrared spectroscopy spectrum, scanning electron microscopic images and energy-dispersive spectrometry. It was also showed that Preyssler heteropolyacid was evenly dispersed on or into the nanofibers and the distribution became denser as the concentration of Preyssler HPA increased. The electrospunned nanofibers were employed successfully for the photodegradation of methyl orange, a common azo dye pollutant in the environment.

Keywords

cellulose acetate, nanocatalyst, nanofibers, photodegradation, preyssler, Azo dyes, Cellulose, Citrus fruits, Cellulose acetates, Dye pollutants, Energy dispersive spectrometry, Heteropoly acids, Hybrid nanofiber, Nano-catalyst, Scanning electron microscopic, methyl orange, nanofiber, sulfuric acid, acetylation, acidification, Article, bleaching, porosity, priority journal, rice husk, surface area, surface property, synthesis, ultraviolet radiation.