

Congo red dye removal under the influence of rotating magnetic field by polypyrrole magnetic nanocomposite

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ABSTRACT:

Studies on magnetic field exposure of congo red contaminated water employing polypyrrole magnetic nanocomposite is reported. Alternating magnetic poles as a function of time has been used to move functionalized nanoparticles in congo red contaminated water. A maximum removal of 94% was observed for the adsorption of 100 mg/L of the adsorbate using 0.15 g of adsorbent at a magnetic field and exposure time of 18.99 mT and 120 min. Percentage of congo red dye removed increased with an increase in the magnetic exposure time of 10–120 min (79–94%). The magnetic force exerted on the magnetic nanoparticles leads to increased adsorption of congo red owing to increased velocity and reorientation of the charged particles. The Langmuir isotherm model had the highest correlation coefficient value and fitted well with the experimental data. The maximum adsorption capacity of 119.76 mg/g was observed using this isotherm model.