ADSORPTIVE REMOVAL OF METHYLENE BLUE DYE FROM AQUEOUS SOLUTIONS USING WASTE RECHARGE CARDS ACTIVATED CARBON

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ABSTRACT

In this research, the synthesis of activated carbon from waste recharge cards carried out by pyrolysis was employed in the treatment of wastewater contaminated with methylene blue. The activated carbon was modified using sodium hydroxide and characterized by x-ray fluorescence (XRF), Fourier transform infrared (FTIR), scanning electron microscopy (SEM), Brunauer-Emmet-Teller (BET) specific surface area and methyl orange adsorption. The XRF showed the existence of carbon (78.93 wt. %) as the major element while the FTIR spectra revealed the presence of C-Cl, C-H, C-F and O-H functional groups in the activated carbon. The BET surface area was 26.781 m²/g and hollow portions that is, sites for adsorption were observed in the SEM image. Based on regression coefficient, Freundlich model ($R^2 = 0.804$) with adsorption capacity, $K_F = 0.0201$ mg/g and the pseudo-second order kinetics model with $R^2 = 0.904$ gave a better fit to the adsorption data. The activated carbon produced from waste recharge cards indicate it is a good adsorbent having adsorbed 58.5 % of the dye pollutants from the water.