

## Bi-amino surface functionalized nanoparticles: synthesis and binary system dye removal from wastewater containing anionic dyes

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## ABSTRACT

In this paper, copper oxide nanoparticle was synthesized, and its surface was modified using *N*-(2-aminoethyl)-3-(trimethoxysilyl)propylamine. The bi-amino surface functionalized nanoparticle (BASFN) was used to remove anionic dyes from single and binary systems. The scanning electron microscopy (SEM), Fourier transform infrared (FTIR) spectroscopy, energy-dispersive X-ray spectroscopy (EDAX) and X-ray diffraction were used to characterize the nanoparticle. Direct Red 80 (DR80) and Direct Green 6 (DG6) were used as anionic dyes. The effect of adsorbent dosage, dye concentration and pH on dye removal was evaluated. Kinetic of dye adsorption on BASFN followed pseudo-second order. The results showed that the experimental data were correlated reasonably well by Langmuir and Freundlich isotherm in single and binary system, respectively. The maximum dye adsorption capacity ( $Q_0$ ) of BASFN was 217 and 250 mg/g for DR80 and DG6, respectively.

Keywords: Synthesis; Nanoparticle; Surface functionalization; Binary system dye removal; Wastewater

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