

SYNTHESIS OF CARBON / Ni-Cu COMPOSITES AS A COLORING WASTES ADSORBENT

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ABSTRACT

This study aims to synthesize carbon composites/Cu-Ni nanoparticles (1:1) and determine their characteristics, as well as determine their characteristics as adsorbents. The adsorbent characters studied included the optimum contact time, adsorption capacity of adsorption at various concentrations of *Congo* red dyes and the order of the adsorption rate.

Carbon composite/Cu-Ni nanoparticle were obtained by impregnating of activated carbon and Cu-Ni nanoparticles. Cu-Ni nanoparticle (1:1) were synthesized using bio reductant of galangal extract (*Alpinia galanga* L.). Characterization of Cu-Ni nanoparticle using Particle Size Analyzer (PSA) and UV-Vis spectrophotometer. Characterization of carbon composite/Cu-Ni nanoparticle using Scanning Electron Microscopy (SEM) and X-Ray Diffraction (XRD). Congo red dye adsorption by carbon composite/Cu-Ni nanoparticle adsorbent was carried out in batch with variations in contact time of 0, 15, 30, 45, 60, and 120 minutes, as well as variations in initial concentration of congo red dyes are 50, 100, 150, 200, and 250 ppm.

Carbon composite/Cu-Ni nanoparticle was successfully synthesized. The character of Cu-Ni (1:1) nanoparticles based on PSA test measuring 55,3 nm and UV-Vis spectrophotometer showed a wavelength of 293 nm. Based on the XRD diffractogram, peaks of 2θ at 44.44° , 50.41° , and 75.43° were identified as typical peaks of bimetal Cu-Ni, while the SEM spectrum showed the distribution of Cu-Ni nanoparticles on the surface with an average size of 183 nm. At 15 min is the optimum contact time for adsorption with an adsorption capacity of 63.65 mg/g. The largest adsorption capacity at the initial concentration of congo red dye was 250 ppm with 103.57 mg/g. The adsorption of Congo red dye by the adsorbent of the carbon/Cu-Ni nanoparticle composite followed a pseudo-second order.

Kata Kunci: *Keywords* : Adsorption, activated carbon, Cu-Ni nanoparticles, congo red dyes