

SYNTHESIS OF CHITOSAN/ ACTIVATED NATURAL ZEOLIT COMPOSITE AS ADSORBENT OF METHYLENE BLUE

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ABSTRACT

Modification of activated natural zeolite with chitosan as methylene blue adsorbent has been studied. The chitosan/zeolite composite (Kit/ZAA) was obtained by activating natural zeolite and then synthesizing chitosan with activated natural zeolite. Chitosan/activated natural zeolite characterization was carried out using FTIR spectrophotometer, *X-Ray Diffractometer* (XRD), *Scanning Electron Microscope – Energy Dispersive X-Ray* (SEM-EDX) and determination of cation exchange capacity. The adsorption study of methylene blue was studied by variation of pH, contact time, concentration, and adsorbent variation. Methylene blue concentration was measured using UV-Vis spectrophotometer at wave length of 663 nm.

Characterization using XRD, FTIR spectrophotometer, SEM-EDX, and determination of cation exchange capacity showed that modification of activated natural zeolite with chitosan was successful. The optimum condition for methylene blue adsorption by chitosan/activated natural zeolite was obtained at pH 12 and contact time of 120 min. Kinetic studies show that the adsorption process follows the second order Langmuir-Hinshelwood kinetic model with adsorption rate constant of $12.25 \text{ g mg}^{-1} \text{ min}^{-1}$. Isothermal studies show that the adsorption process follows the Langmuir isotherm with an adsorption capacity of 38.38 mg g^{-1} .

Keywords: natural zeolite, chitosan, adsorption, and methylene blue



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