## Synthesis and Characterization of Thiourea-Formaldehyde Coated Fe3O4 (TUF@Fe3O4) and Its Application for Adsorption of Methylene Blue

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Abstract : Thiourea-Formaldehyde Pre-Polymer (TUF) was prepared by the reaction thiourea and formaldehyde in basic medium and used as a coating materials for magnetite Fe3O4. The synthesized polymer coated microspheres (TUF@Fe3O4) was characterized using FTIR, TGA SEM and TEM. Its BET surface area was up to 1680 m2 g\_1. The adsorption capacity of this ACF product was evaluated in its adsorption of Methylene Blue (MB) in water under different pH values and different temperature. We found that the adsorption process was well described both by the Langmuir and Freundlich isotherm model. The kinetic processes of MB adsorption onto TUF@Fe3O4 were described in order to provide a more clear interpretation of the adsorption rate and uptake mechanism. The overall kinetic data was acceptably explained by a pseudo second-order rate model. Evaluated  $\Delta$ Go and  $\Delta$ Ho specify the spontaneous and exothermic nature of the reaction. The adsorption takes place with a decrease in entropy ( $\Delta$ So is negative). The monolayer capacity for MB was up to 450 mg g\_1 and was one of the highest among similar polymeric products. It was due to its large BET surface area.

Keywords : TGA, FTIR, magentite, thiourea formaldehyde resin, methylene blue, adsorption

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