

**ADSORPTION OF METHYLENE BLUE USING  
POLYURETHANE FOAM WITH MICROCRYSTALLINE  
CELLULOSE AS A FILLER**

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## ABSTRACT

### ADSORPTION OF DYES USING POLYURETHANE FOAM WITH MICROCRYSTALLINE CELLULOSE AS A FILLER

Polyurethane foam with cellulose as a filler at different weight ratio (PU-MCC 0%, PU-MCC 5%, PU-MCC 10%, PU-MCC 15%) were successfully synthesised in this study. The aim of this project is to study the effect to addition of cellulose to PU foam towards the effectiveness of methylene blue adsorption. Characterisation of PU-MCC was done using Fourier Transform Infrared (FTIR) and X-ray Diffraction (XRD). Chemical reactions between polyol and isocyanates produced polyurethane foam as proved by the presence of peak urethane linkage (NHCOO) near  $3300\text{ cm}^{-1}$  and the outcome of XRD analysis stated that the crystallinity of the cellulose is still preserved as presence of peak  $2\theta = 20^\circ$ . The independent measure analysis was done by performing adsorption of methylene blue by PU-MCC was determined using Ultraviolet Visible (UV-Vis) spectroscopy at  $\lambda_{\text{max}}$  665 nm under few conditions including contact time, temperature, pH and initial concentration of methylene blue solution. This study shows that PU-MCC 15% has the best performance in all conditions and the reusability of the PU-MCC foam was tested, the result showed that it can be reused up until seven times. From this research, it proved that the addition of MCC was necessary to enhance the properties of adsorbing methylene blue by PU foam.