**ENVE 4197-4198**

**2020-2021**

**Thesis title:** Use of boron based minerals for the removal of dyes from aqueous solutions

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# ABSTRACT

In this study, the removal of methyl orange (MetO) from aqueous solutions was investigated using ulexite, a natural boron mineral, as an adsorbent. The target pollutant for the experiment was methyl orange. The functional characteristics, surface morphology and adsorbent were determined by using FTIR and SEM methods. Apart from that, PFO, PSO and Elovich as kinetic models; Langmuir, Freundlinch, Liu and Dubinin-Astakhov models were used as Isotherm models. Batch adsorption experiments showed that the reaction kinetics followed the pseudo-first order model and that the equilibrium period was 90 minutes. The Liu isotherm produced the best equilibrium adsorption results, with a maximum amount of MetO adsorbed per unit weight of ulexite of 1466.3 mg/g (experimental) at 298 °K. The PFO model was the kinetic model, and the Liu model was the isotherm model, and both of these models produced the best results in this study. The contact time and initial dye concentration parameters were also examined. As the contact time increased, the adsorption of the dye on the adsorbent increased for a certain period of time and then reached equilibrium. The results show that ulexite could be a useful adsorbent for MetO, especially at high initial concentrations.