

CHAPTER V

CONCLUSION AND RECOMMENDATION

V.1 Conclusion

The modification of natural zeolite from Ponorogo using NaOH as modifying agent had been successfully conducted. The ratio of zeolite and 6M sodium hydroxide is the best ratio to remove ammonium ion from water. As the ratio of zeolite and sodium hydroxide increase, the ammonium removal efficiency is also increase. The good temperature for adsorption process in this study is 30°C. As the temperature increase, the ammonium uptake from the water is decrease. The adsorption and kinetic experiments were conducted at three different temperatures at static mode condition. Langmuir, Freundlich, Sips, and Toth adsorption equations with its temperature dependent forms were used to correlate the adsorption experimental data, and among these models the Langmuir model could represent the data well with reasonable values of the fitted parameters. For the kinetic study, the well-known pseudo-first order and pseudo-second order equations were used to represent the kinetic data. Pseudo-first order gave better performance than pseudo-second order model. Thomas model also successfully represents the dynamic adsorption data. The comparison characteristics of natural zeolite and 6M-Z,

- a. SEM investigation concluded that the morphology before and after modification is not really different.
- b. XRD investigation shows that the type of zeolite in this study is mordenite.
- c. Nitrogen sorption investigation, shows that as the concentration of sodium hydroxide increase, the pore volume is also increase.

V.2 Recommendation

Zeolite modified sodium hydroxide is recommended to be an adsorbent for removing ammonia in the wastewater treatment. It has proven, in this study the ammonium content in the fish pond water could decrease until 66%.

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