

CHAPTER V

CONCLUSIONS AND RECOMMENDATIONS

5.1 Conclusions

The influence of feed composition at 20.0, 30.0, 50.0, 61.0, 62.9, 70.0, and 80.0 wt% *m*-CNB on precipitate compositions and crystallization temperatures were studied. A mixture containing *m*- and *p*-CNB forms a eutectic mixture having a composition of 62.9 wt% *m*-CNB and 37.1 wt% *p*-CNB by cooling to 22.0 °C. Below the eutectic composition, the precipitates are rich in para isomer, while above the eutectic composition, the precipitates are rich in meta isomer. The result shows that the studied feed solution with adding seeds does not affect the feed solution composition but has a significant influence on the precipitate composition.

The effects of seeds on the crystallization were studied. The result revealed that the presence of *m*- and *p*-CNB seeds induces the crystallization of *p*-CNB precipitates at the feed below the eutectic composition and induces the *m*-CNB precipitates at the feed above the eutectic composition. At the eutectic composition, the added seeds in the CNB mixture increase the amorphous solid composition and decrease the eutectic temperature. Seeds and zeolites have a great influence on the crystallization temperature. Seeds can induce nucleation at a higher temperature than the crystallization temperature of the feed with the zeolites, while the zeolites can induce nucleation at a temperature lower than that required for the crystallization. Furthermore, the effects of *m*- and *p*-CNB seed sizes (20/40 and 12/14 mesh) on the *m*- and *p*-CNB crystallization were studied. The result shows that the different sizes of the same seed does not affect the crystallization temperature and the precipitate composition, but the different types of seeds affect the crystallization temperature at the eutectic composition. The crystallization temperatures of the precipitates at the eutectic composition seem to be independent on the type of a solid material.

5.2 Recommendations

Based on what has been discovered in this study, further study on the crystallization behavior of the feed with the eutectic composition and factors that can influence the final crystalline product should be studied.