

## CHAPTER V

### CONCLUSIONS AND RECOMMENDATIONS

#### 5.1 Conclusions

The effects of adsorbents (NaX, CaX, BaX, NaY, CaY, KY, Al<sub>2</sub>O<sub>3</sub>, SiO<sub>2</sub>, activated carbon and glass bead) on equilibrium binary component adsorption of *m*-CNB and *p*-CNB were investigated. The result indicated that selectivity and adsorption of *m*-CNB and *p*-CNB depended on an adsorbent. The influence of feed compositions at 61.0, 62.9, and 63.5 wt% *m*-CNB on precipitate compositions and crystallization temperatures were studied. The crystallization of *m*- and *p*-CNB at the eutectic composition (62.9 wt% *m*-CNB in the feed) provides precipitates with the CNB composition close to that of the feed by cooling to 23.0 °C. Above the eutectic composition (63.5 wt% *m*-CNB in the feed), the crystals are rich in *m*-CNB, 84.77 wt% by cooling to 23.3 °C, while the opposite is true for the composition below the eutectic composition (61.0 wt% *m*-CNB in the feed), the crystals are rich in *p*-CNB, 90.40 wt% by cooling to 23 °C. The effects of adsorbents on the *m*- and *p*-CNB feed solution compositions were investigated. The results indicate that the presence of the adsorbents does not affect the feed solution composition but has a great influence on the crystal composition. In the feed at the eutectic composition, the amorphous solids become crystal forms with the composition being rich in *p*-CNB. The crystal composition from the feed above the eutectic composition is shifted from being rich in *m*-CNB to rich in *p*-CNB. The crystallization of the feed solution with 10 grains of adsorbents has slightly higher *p*-CNB purity than that from the solution with 5 grains. The crystals near the adsorbents have higher *p*-CNB purity than those far from the adsorbents. The *m*-/*p*-CNB ratio of the crystals is independent on the type of the adsorbent but depends on the size of adsorbent. However, the reason for the shift in the composition from *m*-CNB to *p*-CNB in the crystals has to be further made.

## 5.2 Recommendations

Based on what has been discovered in this study, the following recommendations are suggested.

- 1) The binary phase diagram of *m*-CNB and *p*-CNB with the presence of the adsorbent should be done.
- 2) Factors that can influence the final crystalline product should be studied.