

CHAPTER V

CONCLUSION AND SUGGESTION

5.1 Conclusion

In this research, poly(AAm-co-CA) hydrogels were prepared by foamed solution polymerization using APS and TEMED as an initiator and coinitiator, respectively, and N-MBA as crosslinking agent. This research can be concluded with the following findings:

1. The water absorbency of the synthesized AAm/CA copolymers is higher than that of PAM.

2. The concentration of the redox initiator APS (1% wt.):TEMED (2% wt.) gave the optimum result to achieve the highest water absorbency.

3. In the presence of high crosslinking agent concentrations (N-MBA), more crosslinks can be formed to give rigid chains that reduce the swelling of the gel.

4. The water absorbency in water of the crosslinked copolymer was measured by swelling in distilled water. The highest water absorbing copolymer was synthesized from with 2% mol of crotonic acid, 0.5% wt. of N-MBA and 1% wt. of APS which gave the water absorbency of 211 ± 9 times its dry weight in distilled water.

5. The synthesized copolymer can absorb water up to 126 ± 4 g per g of the dry copolymer within 10 min. The rate of swelling decreased with increasing swelling time. The swelling rate became stable or constant within 20 min, with an average swelling rate of $2.8 \text{ g g}^{-1} \text{ s}^{-1}$.

6. The functional groups of the synthesized copolymer were characterized by FTIR. The result shows that the IR spectra of polyacrylamide give the characteristic

absorption peaks of the $-\text{COONH}_2$ at 3443 cm^{-1} (NH_2 stretching) and 1655 cm^{-1} ($-\text{C}=\text{O}$ stretching).

7. The surface appearance of synthesized copolymers were observed using SEM. The cellular structure with rough irregular surfaces and plenty of porous patterns give the high water absorbency.

8. The electrochemical properties of copolymer were studied by CV. There are some electrons transfer in the polymerization, After 19.26 min of polymerization, a new species was found in the reaction mixture at $E_{pc} = 2.3\text{ V}$.

9. The poly(AAm/CA) superabsorbent polymer can adsorb the dye solution of BB-41. The high dye adsorption was found in the high CA content. Evertheless, PAM can also adsorb cationic dye solution by 20-25%.

10. The P(AAm-co-CA) superabsorbent polymer is a pH-sensitive gel when the pH of the medium is higher than 2.



ศูนย์วิทยทรัพยากร
จุฬาลงกรณ์มหาวิทยาลัย

5.2 Suggestions for Future Work

Synthesis of superabsorbent polymers by solution polymerization would be further studied as follows:-

- a) Other type of hydrophilic/hydrophobic crosslinking agent which may produce a better superabsorbent polymer that can absorb even larger amount of water.
- b) Inclusion of particulate additive to improve gel strength of superabsorbent polymer.
- c) The absorption capacity under pressure and stability test should be investigated.
- d) The electrochemical behavior relating to the copolymerization should be studied for the identification and characterization of species produced during the polymerization.



ศูนย์วิทยทรัพยากร
จุฬาลงกรณ์มหาวิทยาลัย