

CHAPTER 5

CONCLUSION

From this experiment and with regarding to nature of reaction media and temperature as reaction parameters, non-polar solvents are better reaction media than polar ones (except methyl ethyl ketone) for reactivity of sodium ions in etherification at both $26 \pm 2^\circ\text{C}$ and $44 \pm 2^\circ\text{C}$. The reactivities of sodium ions in etherification of cellulose in various reaction media are in the following decreasing orders:

at $26 \pm 2^\circ\text{C}$: methyl ethyl ketone (D.S. 0.643), benzene (D.S. 0.515), toluene (D.S. 0.502), cyclohexane (D.S. 0.497), n-hexane (D.S. 0.494), acetone (D.S. 0.174), iso-propyl alcohol (D.S. 0.029), ethyl alcohol (D.S. 0.021), n-propyl alcohol (D.S. 0.020).

at $44 \pm 2^\circ\text{C}$: methyl ethyl ketone (D.S. 0.655), benzene (D.S. 0.642), toluene (D.S. 0.573), n-hexane (D.S. 0.531), cyclohexane (D.S. 0.494), acetone (D.S. 0.087), ethyl alcohol (D.S. 0.083), n-propyl alcohol (D.S. 0.029), iso-propyl alcohol (D.S. 0.024).

As regards to 4.1, 4.2 and 4.3, the products with D.S. higher than 0.7 can be obtained, with certain reaction limitations (see Table 9), by using methyl ethyl ketone and by benzene as reaction medium.

Table 9 List of etherification products with D.S. higher than 0.700

D.S.	Reaction time (day)	Temperature (°C)	Reaction medium
0.880 \pm 0.010	7	26 \pm 2	methyl ethyl ketone
0.868 \pm 0.010	5	"	" " "
0.788 \pm 0.009	3	"	" " "
0.738 \pm 0.011	7	44 \pm 2	" " "
0.707 \pm 0.008	7	26 \pm 2	benzene

According to 4.4, the deviation of D.S. quantity of etherification products occurs with difference in preparation of cellulose. That is nature of source of cellulose used is one of reaction parameters encountered in considering the D.S. quantity of the products obtained.

However, methyl ethyl ketone is, thus, considered as an excellent reaction medium with high reactivity of sodium ions and with the preferred promotion for further etherification under the certain reaction conditions.

In conclusion, it is, therefore, the extent of reactivity of sodium ions in etherification reaction of cellulose and the inducing tendency of further etherification do clearly depend on several factors involved in the system. *Such typical factors are temperature, reaction medium, reaction time and nature of source of cellulose.*

Since the marked differences in the reactivity of sodium ions in various reaction conditions are known, the results obtained from this study are possibly capable to apply for industrial problem shooting, and for finding out further economics and worthily practical method of preparation in the industry of cellulose, cellulose derivatives and other allied products.