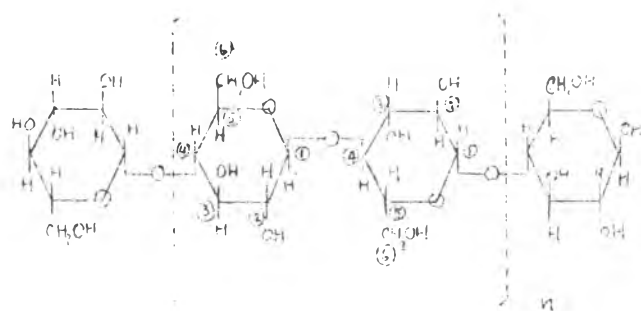


CHAPTER 1

INTRODUCTION

The new developments of science that have taken place in most countries all over the world, are awakening to the realization of the thorough techniques. Such techniques arise and evolve out of a multiplicity of decision in industries. The most volatile technology of the present industrial age is based on chemical transformation which is applicable to the formation of new chemical compounds or industrial products derived from a large number of raw materials. Among those raw materials, cellulose is one that plays an important role not only in industry but also theoretical chemistry. One achievement of chemical transformation of cellulose involves a chemical reaction called "Etherification". However, cellulose alone does not react with etherifying agent (1).



(I)

Structure of Cellulose (n = 25 - 250)

Cellulose (I) is a natural carbohydrate. It is a high polymer

consisting of 1, 4 - anhydro - β - glucose units joined by an oxygen linkage to form long and essentially linear molecular chains (2). In each glucose unit, there are three hydroxyl groups at 2-, 3-, and 6-positions. According to Denham and Woodhouse, the chemical transformation of cellulose by substitution can generally occur only at these three hydroxyl positions (3). The various hydroxyl groups have different reactivities with respect to alkali (4). Cellulose which is subjected to alkali treatment is called "alkali cellulose". Alkali cellulose is considered to be an important intermediate product in the preparation of certain cellulose derivatives as pointed out by N.I. Nikitin (4).

As previously mentioned, cellulose alone does not react with etherifying agent. Alkali cellulose is so far believed to be an intermediate in etherification for most chemical transformations of cellulose. Though the alkali treatment of cellulose has been intensively investigated for years, it has not been completely clarified. It is, however, clear that sodium hydroxide is frequently used in alkali treatment. Sodium ions may impart the effectiveness of the chemical transformation of cellulose especially in etherification. Therefore, the present work is concerned with a study of the reactivity of sodium ions in etherification reaction of cellulose.