

# Preparation and Characteristics of Calcium Alginate Fiber by Calcium Ion Absorption

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## 1. INTRODUCTION

Alginic acid is a linear chain copolymer connected with mannuronic acid(M) and guluronic acid(G) which are of (M) and (G) of C acid have been reported as a structure by the arrangement of its "G" and "M" block or "MG" block through NMR or static model analysis. It has been mainly used by aqueous alginic acid more than non-aqueous type once using chemically. Especially It's the one of the useful source obtained from sea and has superior finishing, bio-degradable, nontoxic and shows high viscosity on dissolving into water by easy transformation to aqueous Sodium alginate. Moreover, It can easily be transformed into fiber, because there is no side chain in its molecular structure. So in this study, Alginate fibers absorbing calcium ions were made by wet-spinning theory, the fibers properties were researched according to different conditions, including the different concentrations of sodium alginate solution and the coagulation bath with the different conc. of  $\text{CaCl}_2$ .

## 2. EXPERIMENTAL

### 2.1 Materials

Sodium alginate where is used in the experiment which sees used  $M_w=240,000$  Wako Pure Chemical products,  $\text{CaCl}_2$  used is 1 class grade a from Aldrich.

### 2.2 Solution process

Sodium alginate solution of 3wt%, 4wt%, 5wt%, 6wt% and 7wt% and coagulate in 5wt% of  $\text{CaCl}_2$  aqueous solutions.

### 2.3 Coagulation bath process

The coagulation bath solution is prepared by using 3 wt%~7 wt% of  $\text{CaCl}_2$  dissolved is distilled water and agitated for 1hours at room temperature.

## 3. RESULTS AND DISCUSSION

### 3.1 Solution viscosity

The concentration of sodium alginate solution influences the viscosity of solution as shown in Fig. 1. The suitable concentration for wet spinning process is selected 5% wt and 6%wt due to low viscosity of 4% wt concentration and in other side too high viscosity of 7%wt of sodium alginate.

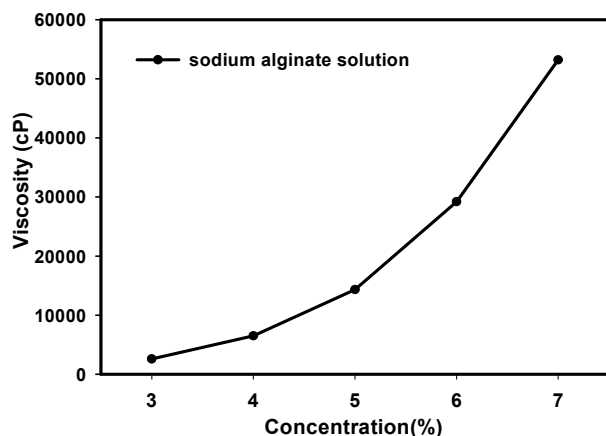


Fig. 1. Viscosity of SA(sodium alginate) solution.

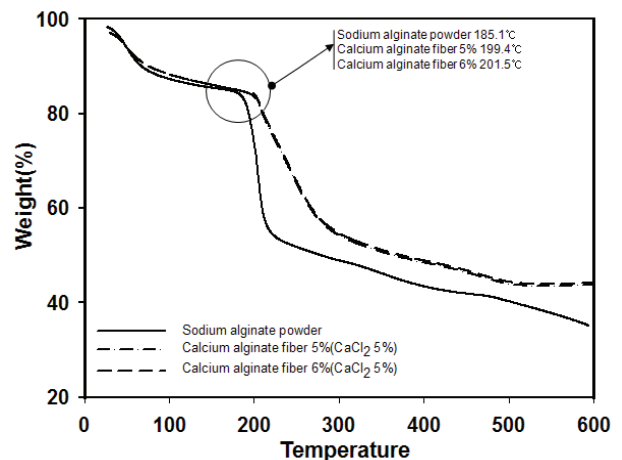


Fig. 2. TGA curve of calcium alginate fiber.

### 3.2 Thermal Characteristics

Fig. 2. the calcium does not know four the fiber opens the weight analyses (TGA) analytical results. TGA measurement resultant calcium does not know four the fiber opening from 216 °C and weight decrement to be started completely being disjointed from 600 °C, confirms with will know purely and the fiber being manufactured confirmed.

### 4. CONCLUSIONS

Alginate fibers absorbing calcium ions were made by wet spinning theory, the fibers properties were researched according to different conditions, including the different concentrations of sodium alginate solution and the coagulation bath with the different conc. of CaCl<sub>2</sub>. Even calcium alginate fiber can be formed by these conditions through wet-spinning theory. One was the sodium alginate solution with the conc. of 5wt%, others were the coagulation bath with the CaCl<sub>2</sub> conc. of 5wt% and 6wt%. Decomposed temperature of calcium alginate fiber with 199°C was higher than that of sodium alginate with 185°C.

### 5. REPERENCES

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