

글루타르알데히드 가교에 의한 혼성배열 폴리비닐알코올 수화겔의 제조

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Preparation of Atactic Poly(vinyl alcohol) Hydrogel by Glutaraldehyde Crosslinking

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1. Introduction

Poly(vinyl alcohol) (PVA) is useful for biomaterials such as contact lens, drug delivery system, and biological tissues, because of good biocompatibility and no toxicity. Particularly, hydrogels have unique position in biomaterial fields because of their high water contents.[1-2] Because atactic PVA (a-PVA) is very weak in water, a-PVA need to be chemically crosslinked with crosslinking agent such as glutaraldehyde to prepare PVA hydrogels with high water-resistance and good physical properties.[3]

2. Experimental

2.1 Preparation of PVA

PVA was prepared by polymerization of vinyl acetate (VAc) and saponification of poly(vinyl acetate) (PVAc). Degree of saponification (DS) and stereoregularities were determined by using a proton-nuclear magnetic resonance ($^1\text{H-NMR}$) spectrometer, and number average degree of polymerization (P_n) were obtained by measuring viscosity of the fully reacetylated specimen in benzene solution with Ubbelohde viscometer.[4]

2.2 Crosslinking reaction of PVA with glutaraldehyde

An aqueous solution of PVA with concentration of 15 wt% was prepared, and

glutaraldehyde and hydrochloric acid with appropriate concentrations were added in solution. After mixing of the solution, the solution was moved in a glass model and kept 2 days. Then the hydrogel samples were washed with distilled water, and dried.

2.3 Properties of PVA hydrogel crosslinked

The water contents and degrees of swelling were calculated with determination of weights of PVA hydrogel and dried PVA hydrogel. And the mechanical properties were determined by using Instron.[5]

3. Results and Discussion

Table 1. shows molecular parameters of (PVA)s prepared by polymerization and saponification. Three samples represent similar (P_n)s and syndiotactic diad contents, whereas (DS)s are showed wide ranges of 87 to 99%. Therefore, the effect of DS of PVA on the crosslinking reaction can be investigated by using these samples. And PVA hydrogels crosslinked with various amounts of glutaraldehyde and hydrochloric acid have differences on the physical properties.

4. Reference

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Table. 1. Characteristics of PVA prepared

	DS(%)	S-diad content(%)	P_n
A	99.9	54.0	1400
B	87.0	54.2	1500
C	98.1	54.1	1500