

## Membrane Formation of Polyacrylonitrile and Its Copolymer

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### Introduction

The phase inversion is a significant phenomena in the preparation of membranes and wet spinning. In both these processes, a viscous dope solution is precipitated in a nonsolvent bath and a porous structure is formed under certain conditions. Such structure could have been considered as a diffusion controlled process[1]. The membrane formation of the polymer solution includes both phase separation and gelation.

We have studied the influence of variables on the final structure and tried to control the porosity and ultrafiltration(UF) performance of the polyacrylonitrile(PAN) and its copolymer.[2]

### Experimental

All the polyacrylonitrile and its copolymer were prepared by emulsion polymerization with potassium persulfate as an initiator. FT-IR (Nicolet, Magna IR 550) and elemental analyzer (Carlo Erba, EA 1108) were used for structure determination of the copolymer. Polymers obtained were dissolved in dimethylformamide (DMF) and DMF-H<sub>2</sub>O mixtures.

We conducted the syneresis[3] and light transmission experiment for observing the demixing process. PAN membrane was prepared by the phase inversion method. The UF performance of these membranes was tested with the Amicon<sup>®</sup> 8050 UF cell.

### Results and Discussion

Syneresis phenomenon was observed in PAN-DMF-H<sub>2</sub>O gels with DMF containing above 5 v%. We also observed that an increase in the H<sub>2</sub>O content in gels would lead to the amount of syneresis to have the maximum value. Light transmission experiments of the membranes show the tendency of delayed demixing. As the amount of the acrylic acid moiety increases, the delayed time of demixing increases.

## References

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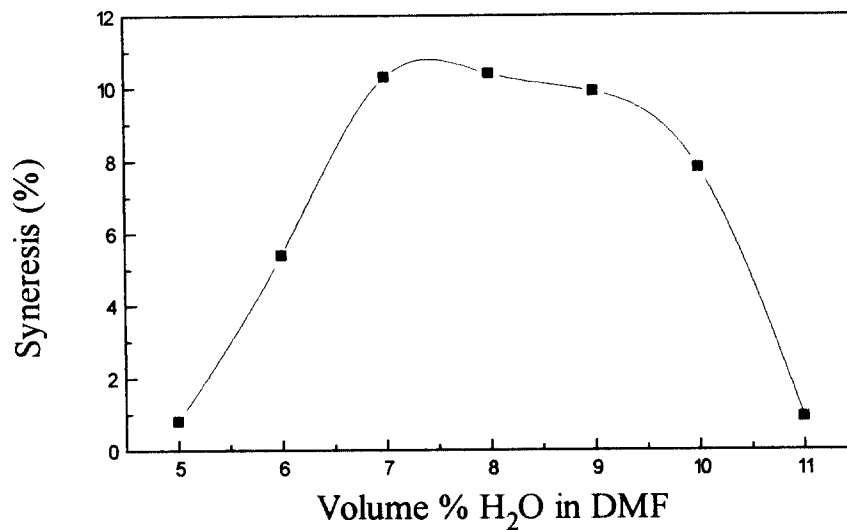


Fig. Syneresis at equilibrium versus H<sub>2</sub>O v% in DMF