

**SIMULATION FOR DRY SPINNING PROCESS WITH
TEMPERATURE-CONCENTRATION DEPENDENT
DIFFUSION COEFFICIENT IN SEGMENTED
POLY(URETHANE-UREA) AND
DIMETHYLACETAMIDE SYSTEM**

Toshiro Yamada⁽¹⁾ and Guangzhu Li⁽¹⁾

⁽¹⁾ *Graduate School of Natural Science & Technology, Kanazawa
University Kakuma-machi Kanazawa, Ishikawa, 920-1192 Japan
E-Mail: tyamada@t.kanazawa-u.ac.jp*

ABSTRACT

A simulation model has been proposed for the dry spinning process where the polymer dope dissolved in solvent is extruded as a spinline from the spinneret, the solvent included in the spinline is evaporated and removed by cross-flow hot gas and finally the spinline is taken up by a winder. This model can give useful information for the design and the manufacturing conditions of dry spinning process.

The diffusion coefficient of solvent in dope is one of the most important parameters in this model, which seems to be influenced not only by temperature but also by solvent concentration. The simulated results with new temperature-concentration dependent diffusion coefficients have been discussed in comparison with only-temperature dependent diffusion coefficients for the Film method measured by the absorption in the solid-state film and the Dope method measured by the desorption from the liquid-state dope.

The simulated results have been discussed as regards the changes in spinline temperature, average solvent concentration, radial solvent concentration distribution, elongational viscosity and spinline deflection during dry spinning. It can be seen from the simulated results that each concentration dependence of diffusion coefficient near the spinneret or the take-up position is comparatively small but the diffusion coefficient is assumed to largely change between the intermediate range of spinneret and take-up position.