

INVESTIGATING THE INFLUENCE OF FABRICATION PARAMETERS ON THE DIAMETER AND MECHANICAL PROPERTIES OF POLYSULFONE HOLLOW-FIBER MEMBRANES

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Abstract: Polysulfone hollow-fiber membranes were fabricated via the dry-wet solution spinning technique. The objective was to demonstrate the influence of the various fabrication parameters on the diameter and mechanical properties of the hollow-fiber membranes. The effects of these operation parameters were investigated using an experimental design based on a fractional factorial method (Taguch's design of experiments). The parameters that were considered are the spinneret size, dope solution temperature, bore fluid temperature, coagulation bath temperature, dope extrusion rate and the take-up speed. The diameter of the hollow-fibers were determined using a scanning electron microscope (SEM) while the mechanical properties were measured using a tensile tester. The results showed the significance of the fabrication parameters that dominate the diameter and strength of the hollow-fibers.

Keywords: Hollow-fiber membrane; Spinning; Taguch's method; Take-up speed; Extrusion rate; Spinneret size.