ABSTRACT

The proposal of this research is to produce synthetic membranes through the process of phase inversion via immersion precipitation, and obtain some operational data relating to the preparation of the polymeric solution and its casting on an inert support layer, in order to obtain uniform membranes, free from flaws which might affect its performance. Such uniformity requires the production of homogeneous polymer solutions, free from bubbles or suspended solids and with a suitable viscosity, in order to avoid loss of thickness until the solidification of polymer occurs. Polysulfone was employed as polymer, N-methyl-2 pyrrolidone as a solvent, non-woven polyester as inert support and demineralized water as non-solvent. The solutions were prepared with concentrations of polymer of approximately 15%, 20% and 25% and, after casting, immersed in a coagulation bath containing demineralized water at approximately 23^{o}C, 40^{o}C and 50^{o}C. The membranes obtained after precipitation were rinsed in demineralized water and evaluated through scanning electron microscopy, and some other tests, as the permeability, the mechanical and contact angle tests.

Taking a few parameters found in the literature, we intended to obtain additional data to define a procedure for the preparation of membranes using the afore mentioned process.

The tests indicated that the use of high purity raw materials and proper solution preparation parameters as temperature, speed, relative humidity and stirring time are very important to obtain an homogeneous solution. Besides, the use of motorized film application equipment with adjustments for film thickness, casting speed, temperature, and controlled water content in air are essential in obtaining a good film definition, and ensuring the reproducibility in the synthesis of membranes with a desired quality.

The use of suitable non-woven fabric as a inert support with smooth and homogeneous surface is very important in order to obtain uniform polymer layers, ensuring morphological conditions suitable for achieving levels of productivity and selectivity, compatible with processes where typically membranes are employed.

Key-words: Water treatment. Ultrafiltration. Membrane Separation. Polymers.