MEMBRANES' POROSITY EVALUATION BY COMPUTER-AIDED ANALYSIS OF SEM IMAGES - A PRELIMINARY STUDY

Andrzej Chwojnowski, Małgorzata Przytulska, Diana Wierzbicka, Juliusz Kulikowski, Cezary Wojciechowski

Nałęcz Institute of Biocybernetics and Biomedical Engineering, Polish Academy of Sciences, Warsaw, Poland

Abstract:

The problem of quality control of membranes destined for medical applications is presented. The shape of the membranes surface, its structure, porosity and coarseness are of importance in contact with live cells or simply with live tissue, and as such they should be controlled. For this purpose, scanning electron microscopy (SEM) in our work was used. Results of capillary polysulphone (PSF) 70000 m.m. and polyetherosulphone (PES) 42000 m.m. membranes examination are described. An attempt to apply the computer-aided SEM images processing methods to the membranes' porosity evaluation was made and is presented in the paper. In particular, an approach to segmentation of contours of micropores in the visualized membrane 's sections and to evaluation of their morphological parameters is described. An attempt to an approximate statistical reconstruction of 3-dimensional structure of micropores on the basis of collections of 2-dimensional membranes' sections is also described.

Keywords: polysulphone membrane porosity, semipermeable polysulphone membranes, structure polysulphone membranes, computer-aided image processing