465d Low Protein Fouling Synthetic Membranes by Photo-Induced Graft Polymerization: New Monomers with Exciting Properties

Ravindra Kumar, Chao Zhu, and Georges Belfort

The goals of this work were to develop and test the modified poly(ether sulfone) ultrafiltration membranes using four new graft-polymerizable vinyl monomers. Two of these monomers were chosen because of their high hydrophilic character and two others were chosen because of their well-known effect as excipients. This work is a continuation of earlier studies in our group and compares the performance of UF membranes between those previously grafted with monomers such as N-(vinyl-2-pyrrolidone) (NVP), and 2-(hydroxyethyl) methacrylate (HEMA) and the new monomers referred to above. One of the new selected monomers is the least expensive among all monomers tested and exhibits performance that is comparable to NVP, the most widely studied monomer to date. Monomers were also synthesized in our laboratory using a novel method from the literature. Results obtained with UV-assisted graft polymerization for these vinyl monomers on poly(ether sulfone) membranes are presented. They exhibited higher flux, and higher rejection as compared to unmodified PES membranes. These results indicate that the new vinyl monomers could be an excellent choice for modification of PES membranes as they can be easily synthesized from commonly available precursors (low cost) and may have applications with other polymers apart from poly(aryl sulfone) membranes.

*Current address: Ravidra Kumar, R & D Applications Group, Millipore Corp., Bedford, MA 01730 # Current address: Dr. Chao Zhu, 5115 Plant Sciences Building, University of Maryland Biotechnology Institute, College Park, MD 20742