

Fabrication of multilayered membrane assemblies.

Oleksandr Burtovyy¹, Viktor Klep¹, Tacibaht Turel², Yasser Gowayed², Igor Luzinov¹.

¹Department of Material Science and Engineering, Clemson University
271C Sistine Hall, Clemson, SC, 29634

²Department of Polymer and Fiber Engineering, Auburn University
Auburn AL 36849

ABSTRACT

Multilayered assemblies from hydrophilic, hydrophobic, and reactive/adsorptive membranes were fabricated using different nano- and micro- particles as spacers. Initial surface modification of membranes was carried out by grafting of nanothick polymer layer using “grafting to” approach. Scanning electron microscopy (SEM) images and peel-off tests demonstrated that particles were well distributed on the membrane surface and after an annealing procedure were firmly attached to the surface. The membranes in the assemblies did not contact each other and were joined via particles in between. It was essential to find conditions for the assembly that insured sufficient adhesion between the layers but did not lead to “smashing” of the membrane internal structure. Before the fabrication of the multilayered structure each individual layer was thoroughly characterized.