SYNERGISTIC EFFECTS OF STRUCTURAL CHARACTERISTICS OF QUATERNIZED POLYSULFONE/CELLULOSE ACETATE PHTHALATE BLENDS ON SURFACE PROPERTIES

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Abstract

An alternative in order to obtain of new complex polymeric materials is represented by the blending polymers, thus creating a balance between the properties of individual components. New quaternized polysulfones (PSFQ)/cellulose acetate phthalate (CAP) blends were investigated for establishing the structural and compositional characteristics with impact on the surface properties. In this context, the synergistic effects generated by the charged groups from the alkyl radical of the quaternized polysulfones, flexible and hydrophilic nature of CAP in casting solution of polysulfone significantly influenced the surface tension parameters, surface free energy, and topographic reorganization. Moreover, the CAP composition, as well as the history of the formed films provide the controlling surface properties and are responsible for performance properties of the final membranes.

In order to understand the correlation between the structural particularities and the resulting properties a deep analysis of the morphology must be performed (Figure 1).

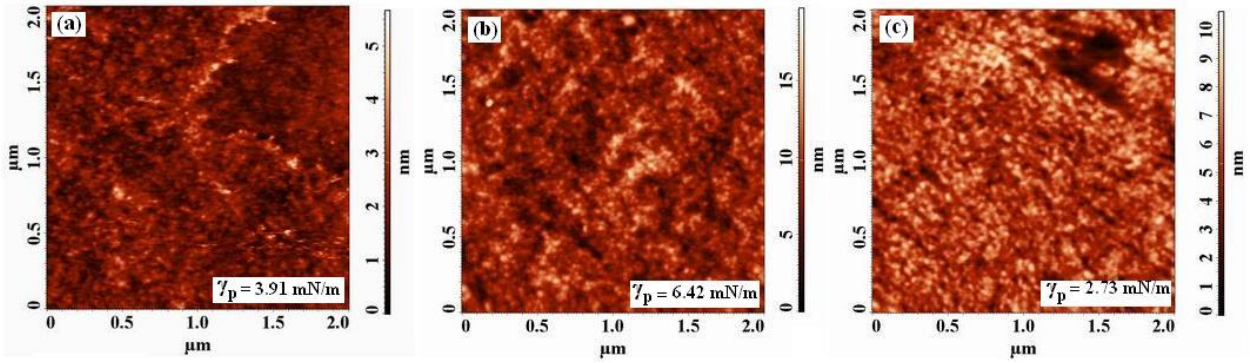

Figure 1. 2D images of topography performed by atomic force microscopy for samples: (a) PSFQ, (b) CAP, and PSFQ/CAP blend at 50/50 w/w composition. Variation of polar components of total surface tension, γ_p

Varying the polymer blend composition in the casting solutions were modified the morphological characteristics and pore numbers, as well as surface energy characteristics. These results indicate that apart from the history of the films formed from solutions in NMP, the nature of the functional groups spread all along the chain and charge density of the PSFQ, affects these parameters.

It can be concluded that, the resulted data are important in designing of PSFQ/CAP blends, with controllable porosity and hydrophilicity, as potential performance materials used in biomedical fields.