

## O-66 TRANSPORT PROPERTIES OF POLYMER MEMBRANES: CONTACT ANGLES DATA

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The surface free energy ( $\gamma_{SV}$ ) of amorphous polymers films was determined using contact angle measurements (Owens-Wendt-Kaelble approach). Polymers (polynorbornenes, polytrimethylsilylpropine (PTMSP), polymethylpentine (PMP)) were synthesized and characterized in Topchiev Institute of Petrochemical Synthesis. Also commercial objects Teflons AF (Du Pont) and Hyflones AD (Solvay-Solexis) were used.

It was found that the dispersive component ( $\gamma_{SV}^d$ ) makes the major contribution in  $\gamma_{SV}$  value. The correlation of  $\gamma_{SV}^d$  with literature data about gas permeability of polymer membranes and fractional free volume ( $FFV$ ) of polymers was found. The results obtained were explained with position of similarity of contact interactions between the solid spherical particles and centers of masses of polymer coils in polymer films.

Wetting of PTMSP and PMP films with alcohol solutions was studied. Ethanol, propanol-1, propanol-2 and butanol-1 were used. Also the surface tension  $\gamma_{LV}$  of aqueous alcohol solution of different concentrations ( $c$ ) was measured. The isotherms of wetting strain  $\gamma_{LV}\cos\theta_r = f(c)$  were analyzed using receding contact angles  $\theta_r$  to simulate the process of nanofiltration of liquid mixtures through the continual polymer membranes. The concentration corresponding to maximum of  $\gamma_{LV}\cos\theta = f(c)$  depends on  $FFV$  of polymer and the alcohol hydrocarbon chain length. It was proposed that these concentrations correspond to the beginning of alcohol sorption in polymer film. So, new perspectives of contact angle measurements for prediction of polymer membrane efficiency with respect to gas and liquid transport were demonstrated.

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