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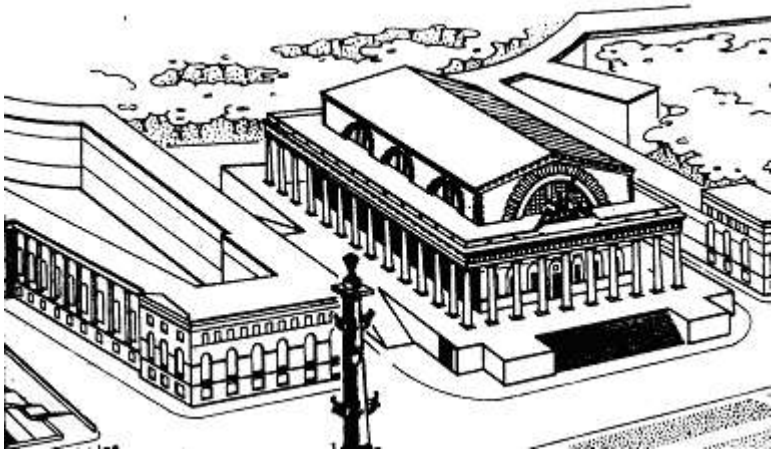
LABORATORY OF BIOMIMETIC POLYMER

MODERN PROBLEMS OF POLYMER SCIENCE



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MEMBRANES BASED ON POLYMER-METAL COMPLEX FOR SEPARATION OF ORGANIC MIXTURES BY PERVAPORATION

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One of the main problems of refining process is purification of alkanes from solvent impurities. Methanol is one of the common and widely used organic solvents; thus, separation of methanol – n-heptane mixture for the purpose of regenerating individual components seems to be an important industrial task. Pervaporation is a promising membrane technique which allows separating azeotropic and thermally unstable liquid mixtures. However, developing novel membrane materials remains a priority in the field of membrane technology. In present work, novel polymer membranes based on aromatic polyamide (PA) and polymer-metal complex PA-Cu were obtained.

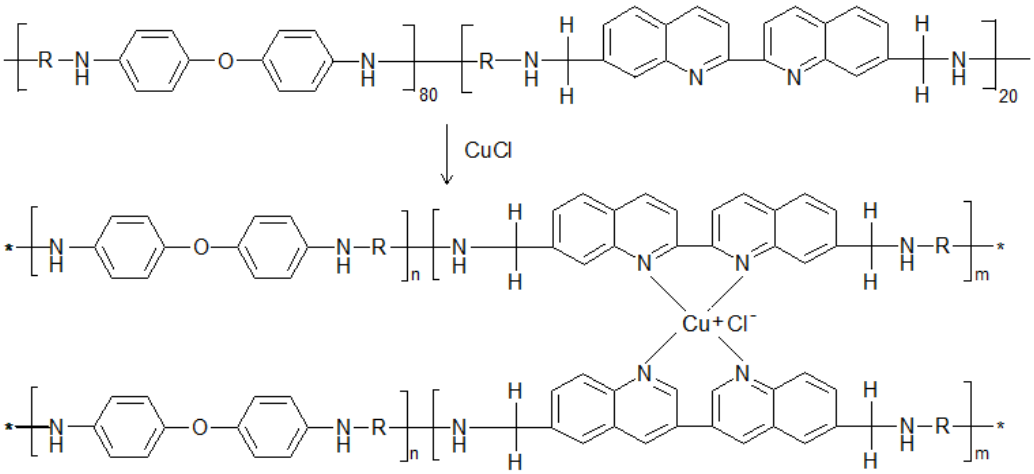

Fig.1. Scheme of PA to PA-Cu transformation.

In the course of this work, physico-chemical and transport properties of the obtained membranes were investigated. The membrane structure was studied by scanning electron microscopy (SEM). The density of the films was determined by flotation method in a mixture of toluene and CCl_4. Contact angle measurements were carried out for membrane surface characterization. Thermogravimetric analysis was used to investigate heat resistance of the membranes. Mass transfer through the membranes and their transport properties were studied by sorption experiments and pervaporation of methanol – n-heptane mixture in a wide range of concentrations. It was found that the developed membranes based on polymer-metal complex produce the permeate enriched with methanol thus allowing to obtain high-purity n-heptane and recover methanol for its further use as industrial solvent.

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