

DESCRIPTION FOR THE GENERAL PUBLIC

Ethyl alcohol, due to its accessibility, is one of the best known organic substances. The industry is primarily used as a solvent, disinfectant or as a component of medicines, cosmetics and household products. It is understood that about 70% of the world production of ethanol is used as fuel for internal combustion engines. In our climate zone component of gasoline can be ethyl alcohol deprived of water. As is known, there is no possibility of break barrier to the ethanol solution concentration, due to the fact that the creation of the system ethanol-water azeotrope containing 95.6% ethanol. So, to obtain a more concentrated solutions use other than conventional distillation techniques and special attention should be paid for membrane separation techniques.

Membrane processes are relatively new and still evolving technique of separation with considerable potential possibilities. Due to the relatively low power consumption, high selectivity, and no need for additional substances supporting section are attractive methods of separation. Despite the many advantages of these processes, the practical use find only a few of them, what is connecting with difficulty in obtaining membrane materials for specific separation process. In that case, preparation of membrane material is a key for the possibility of using the membrane techniques in separation process of the specified mixture.

Preparation of organic-inorganic hybrids is one of method of improving the properties of the obtained materials. The benefits of this type of surgery are significant, starting from the reduced manufacturing cost of such materials, as compared to ceramic membranes, and ending with improved physicochemical, thermal and mechanical properties polymeric membranes. Until now, many kinds of inorganic nanoparticles, were used as a component of polymeric membranes. Despite of numerous literature reports about the positive effect of this kind of modification on the properties of the polymer matrix, only a small part of them have been so far used as a component of the membranes for separation processes. In addition, the literature contains, unfortunately, very little information on influence of the type and content of magnetic filler on separation properties of membranes used in pervaporation or vapor permeation processes.

The aim of the project is to obtain new and innovative hybrid materials based on chitosan and containing ferromagnetic filler. Beside the structural characteristics of obtained materials, in the framework of the research the effects of the type of filling, its contents, and generated by them magnetic field on the efficiency of the ethyl alcohol dehydration by pervaporation and vapor permeation processes would be expanded. The project includes conducting a series of experiments designed to help optimize the properties of the separation membrane material, better understanding of the mechanism of separation of components of the mixture through the composite membranes as well as the role of magnetic nanoparticles in both separation processes.