**Development and characterization of membranes based on biopolymers for the enhanced separation of industrially important mixtures"**

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In recent years, membrane processes have been increasingly used in industry, both individually and in hybrid processes. This is due to the good performance characteristics of membrane processes, such as energy saving, compact equipment, reagent-free (as a rule) and high efficiency of separation of liquid and gas mixtures. Moreover, membrane processes are considered as sustainable processes due to their environmental friendliness and cleanliness. However, to make separation processes more environmentally friendly, it is necessary to replace synthetic polymer materials with biopolymers to solve certain industrial separation problems.

This work is devoted to the application of biopolymers for the development of membrane materials for the use in membrane processes such as pervaporation and ultrafiltration. The choice of these processes is due to the different driving force and porosity of the used materials (pervaporation uses non-porous membranes, while ultrafiltration uses porous ones), which allows these membrane materials to be used for a wide range of applications/separations. Cellulose derivatives, sodium alginate, chitosan and polyelectrolyte complexes based on biopolymers will be presented as polymer materials. To get the tailored properties for these polymer materials the bulk (introduction of modifiers into the casting solution: carbon particles, metal–organic frameworks, polymer blends) and surface (layer-by-layer assembly of polyelectrolytes) modifications will be applied to change the surface properties of modified membranes (hydrophilic-hydrophobic balance) and internal structure (free volume and membrane porosity). Various methods of analysis (spectroscopic methods, microscopic methods, thermogravimetric analysis, measurement of contact angles, etc.) will be presented to demonstrate the structural and physicochemical changes of modified membranes. The results for water treatment and dehydration will be presented to demonstrate the change in transport properties of modified membranes based on biopolymers.

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