

Chemistry Department

Solvent resistant EPS membranes

Biochemical and process engineering group



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Scientific articles: 1

Objectives

Development and characterisation of novel membranes based on microbial extracellular polysaccharides (EPS), produced from glycerol by-product streams of biodiesel production;

Evaluation of the membranes developed in systems with industrial relevance, such as solvent dehydration and solvent purification, by pervaporation; and for separation of organic solvents by nanofiltration.

Methodology

Membranes with enhanced water resistance and water selectivity will be developed using selected strategies:

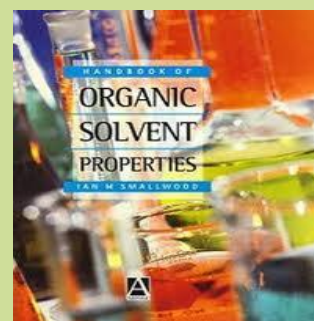
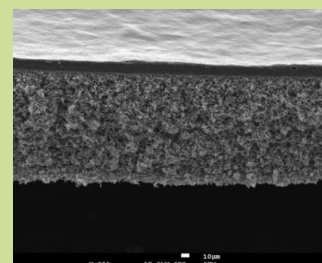
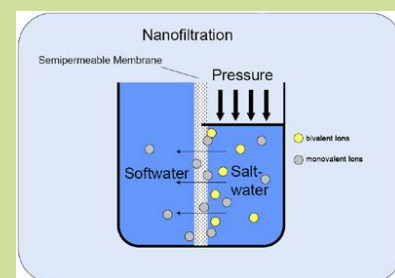
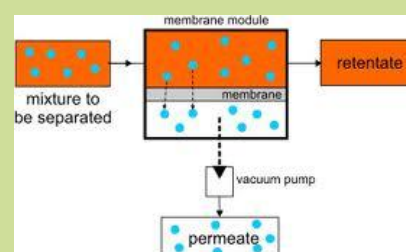
- Polymer cross-linking (different crosslinking agents and crosslinking protocols);
- Incorporation of inorganic nanoparticles in the polymer matrix (natural clays and zeolites type A)
- Self-assembly of layer-by-layer polyelectrolyte films (chitosan and EPS).

The membranes developed will be characterized in terms of thermal and mechanical properties, internal and surface morphology, resistance to selected solvents, transport properties (namely selectivity for water) and life-time.

Expected Results

Two types of membranes, homogeneous (EPS) and composite of EPS with polyethersulfone (PES) as support (EPS-PES) were prepared. They revealed to be insoluble in all solvents tested. Moreover, when cross-linked with appropriate agents, these films become insoluble in aqueous solutions while maintaining their resistance to organic solvents.

The composite membrane, at a water feed concentration of 5.0 wt%, showed a water/ethanol selectivity of 3000. These features make them particularly interesting to be applied as solvent resistant membranes.



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