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# Phase separation of concentrated polymer solutions for making porous filtration membranes

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Phase separation (PS) of concentrated homopolymer solutions is surprisingly much more complicated than textbook descriptions though it is of practical importance in particular for mastering the process of membranes fabrication. A first complication is the necessity of taking into account the polymer dispersion in size and of reaching a correct description of the mobility dependance with concentration. I will first address these two aspects by describing growth laws of polymer phases thanks to experiments with poly(vinyl alcohol) and phase-field simulations respectively.[1, 2] New kind of porous membranes can be made by PS of water-soluble polymers but many of the latter exhibit anomalous phase diagrams which seem to be closely connected to unusual features of arrested-like PS as evidenced by light scattering and confocal microscopy. I will describe first attempts of membrane making with these polymers avoiding the use of organic solvents as well as numerical approach to describe the process. [3, 4, 5]

The case of polyelectrolytes is also of great interest since the theory is still controversial but polyelectrolytes are important precursors for polyimide membranes. First results will be presented about phase separation upon changes in salt concentration, polymer concentration and temperature.

**Keywords:** phase separation, polymer solutions, membranes **Session 2nd choice**: 9

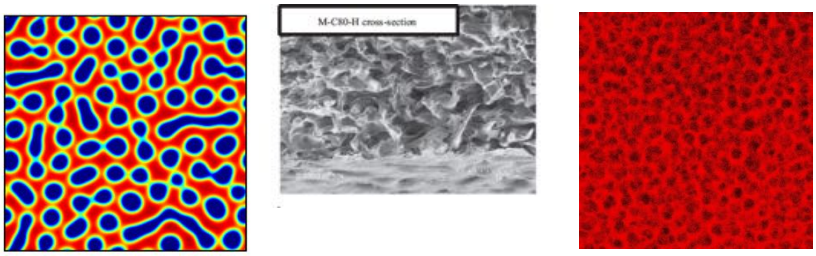



***Figure 1.*** *From left to right: a simulation of phase separation in polymer solution; a membrane made by phase separation of poly (vinyl alcohol); a phase separation pattern of poly (vinyl alcohol) solution*

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