Research group Membrane Materials and Processes

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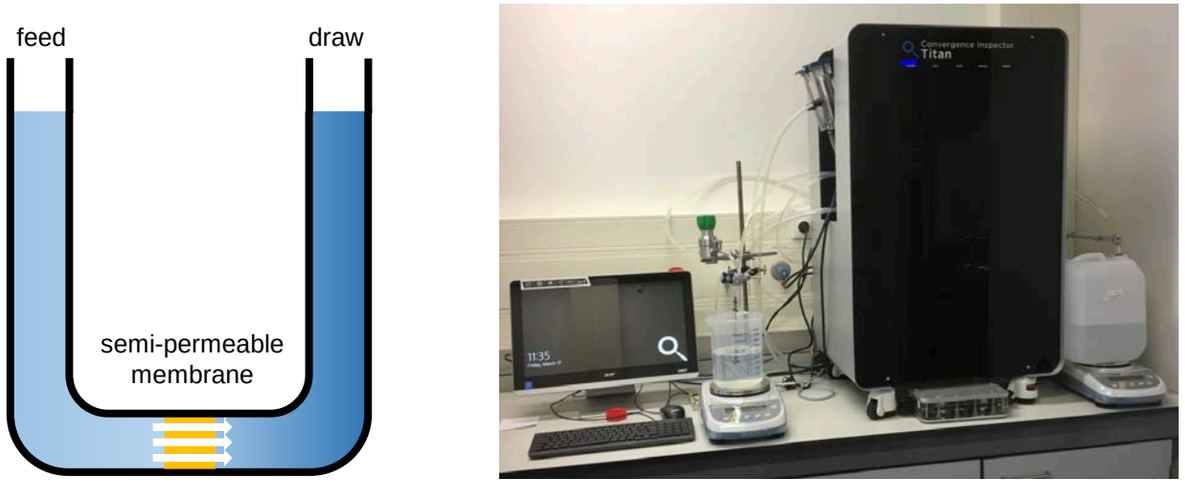
Forward osmosis

Convergence, Inspector

Introduction

Forward osmosis (FO) is an osmotically driven membrane process where water diffuses through a semi-permeable membrane from a low osmotic (feed) solution to a high osmotic (draw) solution.

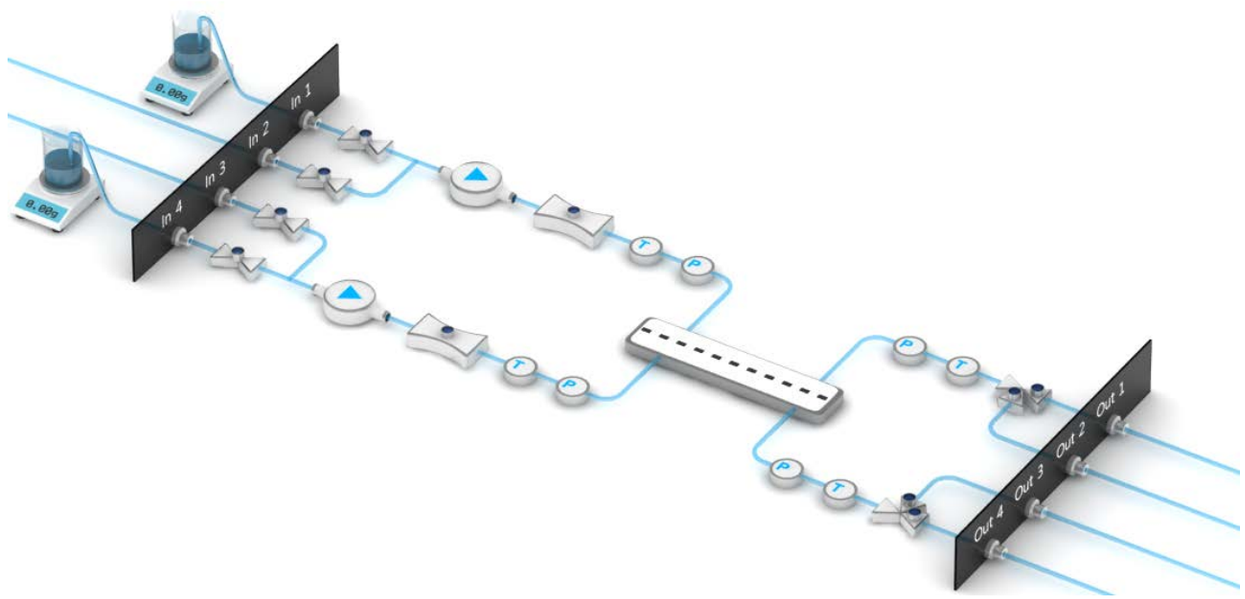


Principle of forward osmosis and the FO-system.

Principle

The Convergence Inspector has been developed to evaluate the process and performance of FO membranes. The basis of the system is a dual circulation loop: a feed and draw solution. The water transport through the membrane measured by top scales, allows to calculate the concentration factor. The conductivity measurements in the feed and draw solution allow to calculate the osmotic pressure and possible salt back-diffusion.

Pumps, flow sensors, temperature and pressure sensors register all relevant process parameters. The extra valves, allow recirculation or single passage experiment and allow to carry out automatic cleaning sequences.



Schematic representation of the FO-system

Applications

- Dilution (indirect water production)
- Direct water production (clean water extraction followed by an complementary separation process)
- Concentrating product streams by water extraction
- Valorization of rest streams by water extraction
- Membrane performance characterization