Preparation of macroporous hydrophobic flat-sheet PVDF membranes via vapor induced phase separation

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Non-solvent vs. vapor induced phase separation

Materials & methods

- **VIPS & NIPS casting done at set conditions**
  - relative humidity (NIPS < 30%)
  - exposure time
  - temperature
  - casting speed
  - air flow velocity

- **characterization**
  - SEM
  - porosity
  - perm porometry
  - thickness
  - gas permeability
  - contact angle

Results

SEM images of membranes casted by the NIPS and VIPS method with short and long exposure time; contact angle measurements for no, short and long exposure time to humid air

- **VIPS** is a promising method for preparation of highly porous and isotropic membranes in the range of microfiltration
- Only 1 min of VIPS changes membrane structure drastically
- Pore size distribution for VIPS membranes is more narrow for long exposure time
- Even though the porosity is similar for NIPS and VIPS, VIPS membranes show much higher flux due to changes in membrane structure (finger like -> sponge like)

Conclusion

- Parameters for the VIPS process need to be further explored in order to adjust certain specific membrane characteristics
- For even higher hydrophobicity membranes which can withstand plasma post treatment are of interest

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