

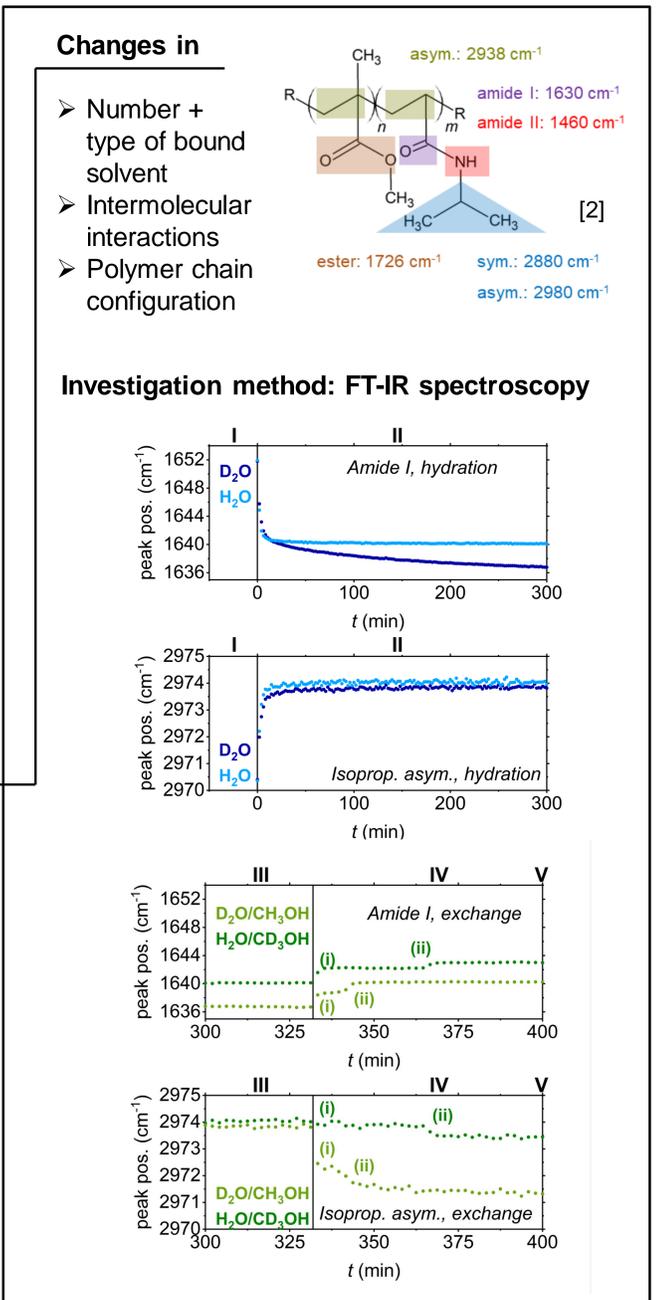
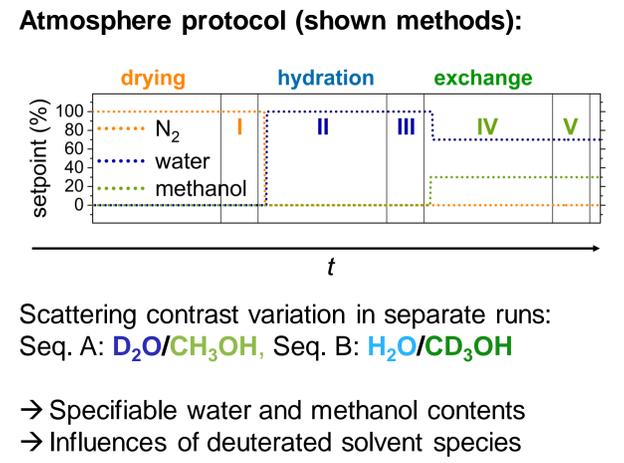
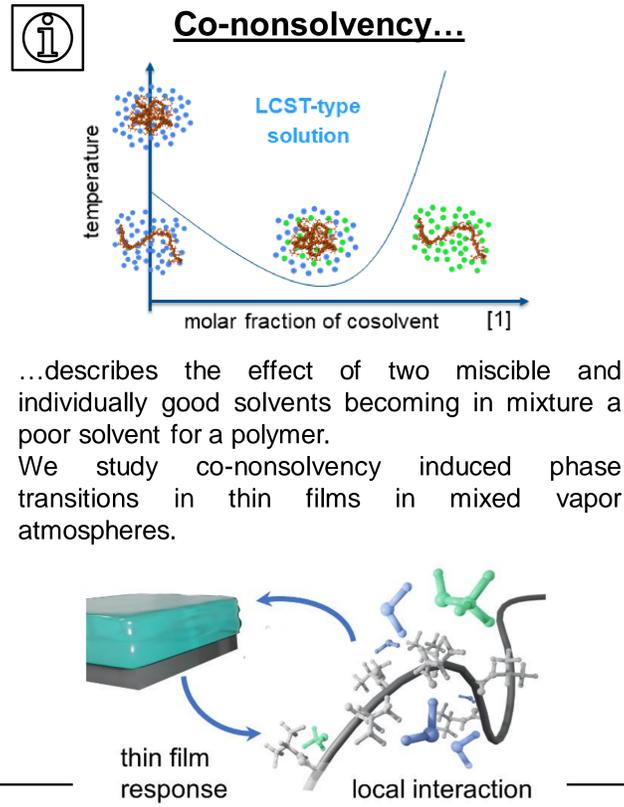
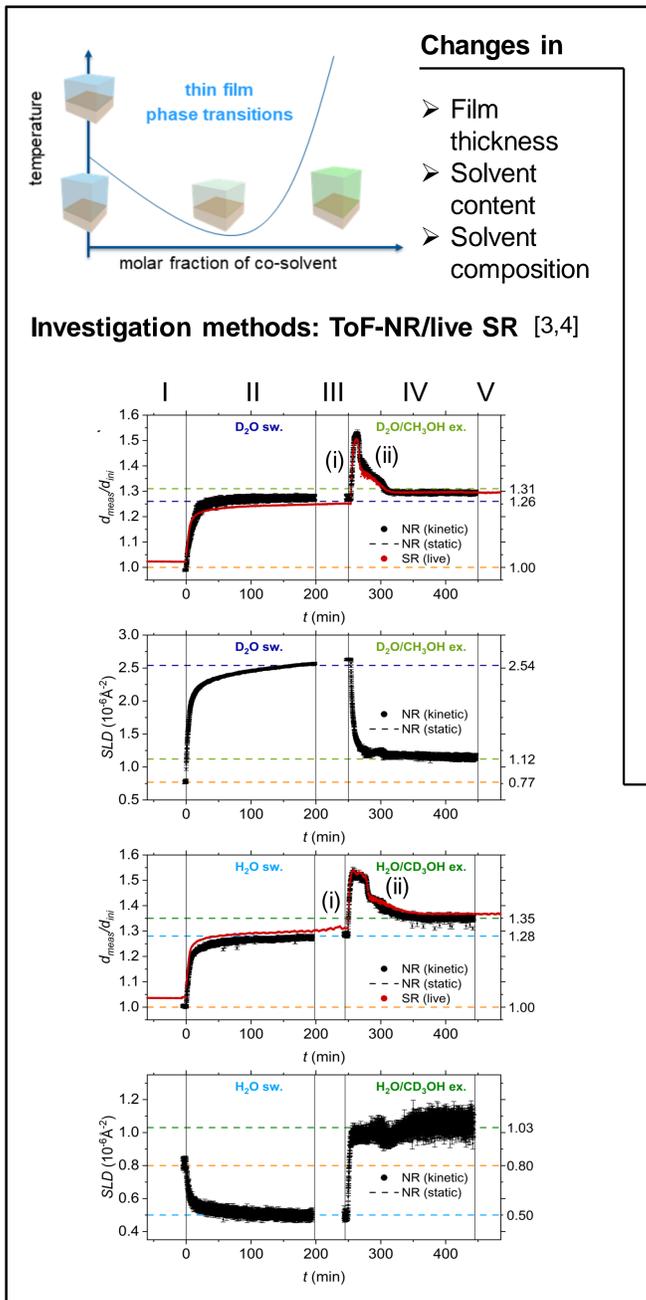
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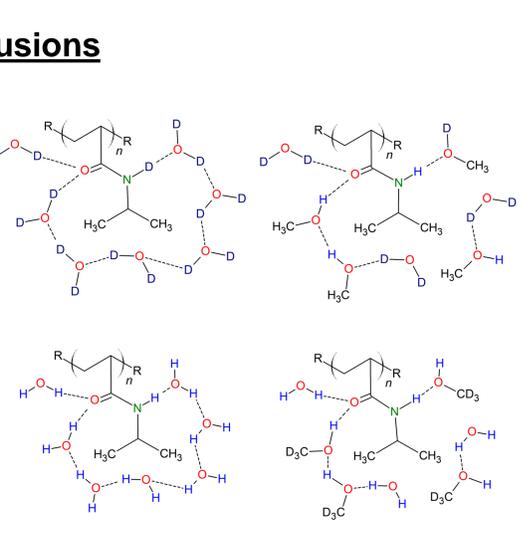
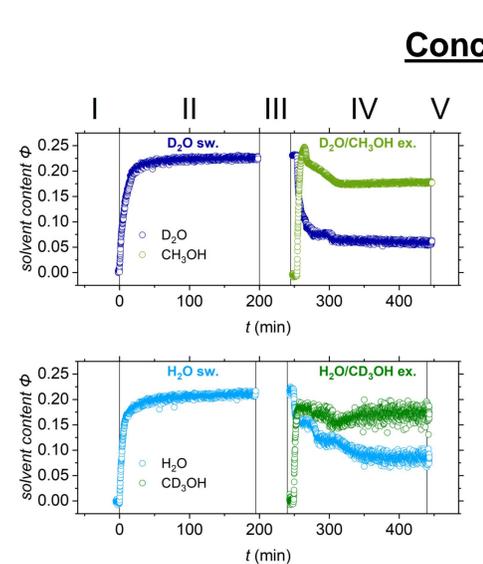
### Thickness and solvent content

#### Hydration

Swelling to ratio  $d_{meas}/d_{ini} = 1.27$   
 Water content  $\phi = 0.23$   
 Ongoing deuteration process

#### Exchange

Initial reswelling (i) to Intermediate maximum swelling ratio  $d_{meas}/d_{ini} = 1.5$  due to methanol absorption  
 Collapse and reorder transition (ii) due to water and methanol release



Exchange kinetics and final water content are dependent on scattering contrast variation sequence:

- D<sub>2</sub>O is released faster and the final D<sub>2</sub>O content is lower than the H<sub>2</sub>O content
- More CH<sub>3</sub>OH than CD<sub>3</sub>OH is absorbed in the intermediate state with max. swelling ratio
- The final methanol (CH<sub>3</sub>OH and CD<sub>3</sub>OH) content is similar

Buildup and depletion of the hydration shell depends on strength of hydrogen bonds:

- Formation of hydrogen bonds with amide group with ongoing H/D exchange
- Kinetics correspond with observations made for thickness and solvent content development, strong dependency on hydrophobic hydration water

