

Solvent Extraction Design for Highly Viscous Systems

Maria C. Quaresima, Markus Schmidt, Andreas Pfennig
mariachiara.quaresima@uliege.be
Products, Environment, and Processes (PEPs)
Department of Chemical Engineering
Université de Liège, Belgium
www.chemeng.uliege.be

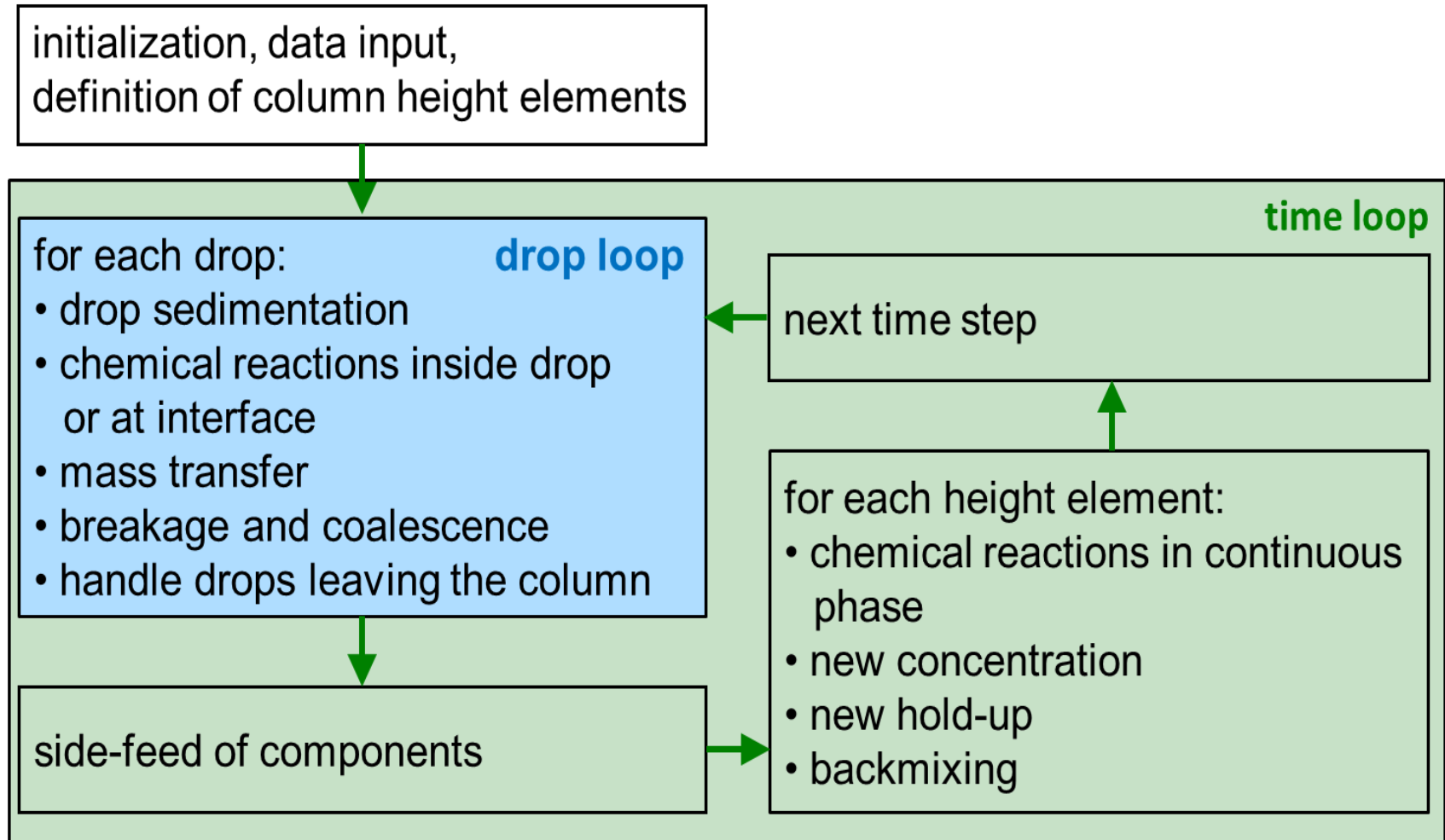
agenda

- motivation
- extraction column design
- single-drop behavior
 - sedimentation
 - mass transfer
- conclusions and perspectives

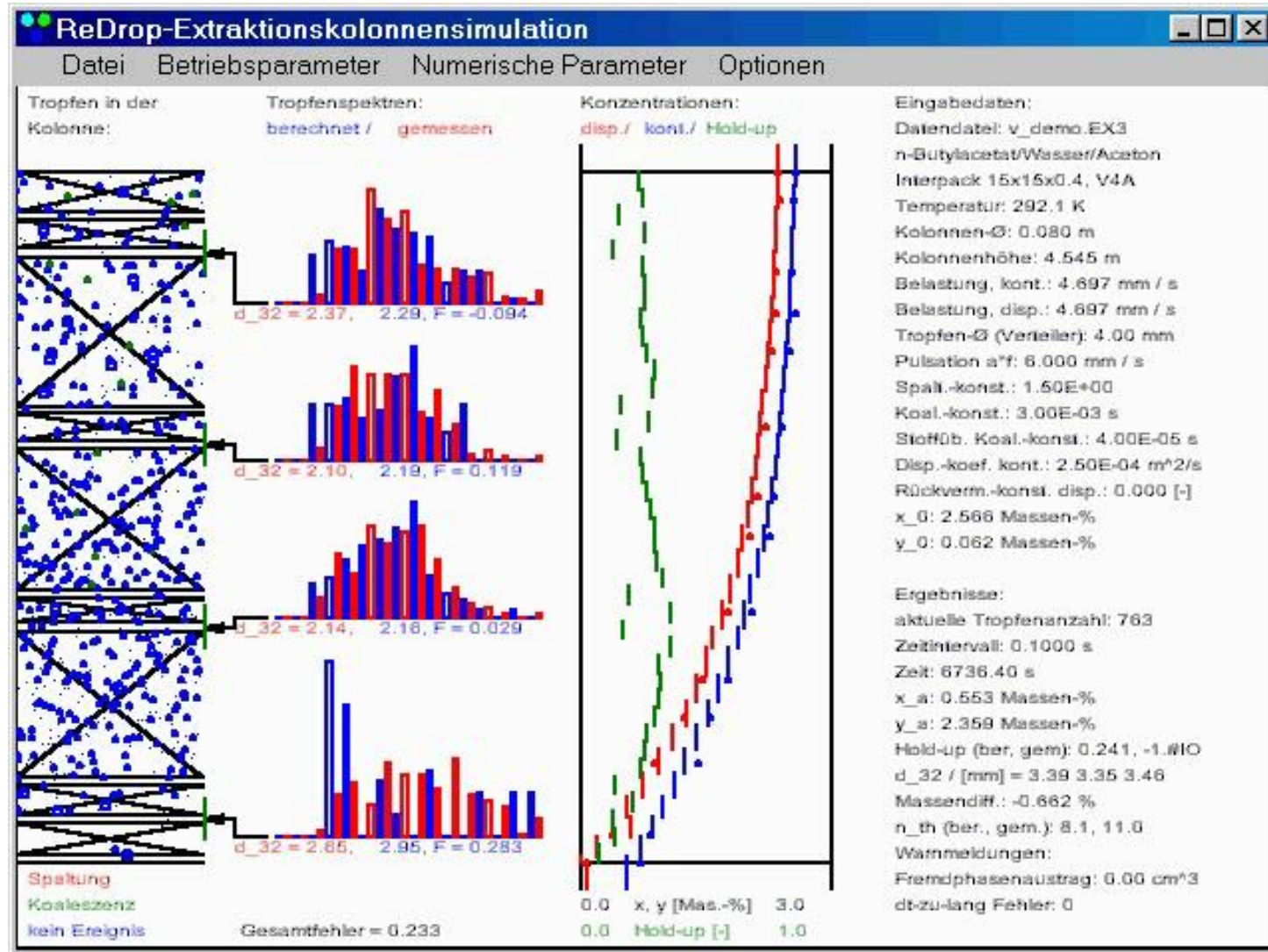
motivation

- sources: fossil-based → bio-based
 - higher oxygen content
 - lower vapor pressure
 - higher viscosity
- pilot-plant based design is time consuming, expensive
 - design based on lab-scale experiments and simulations

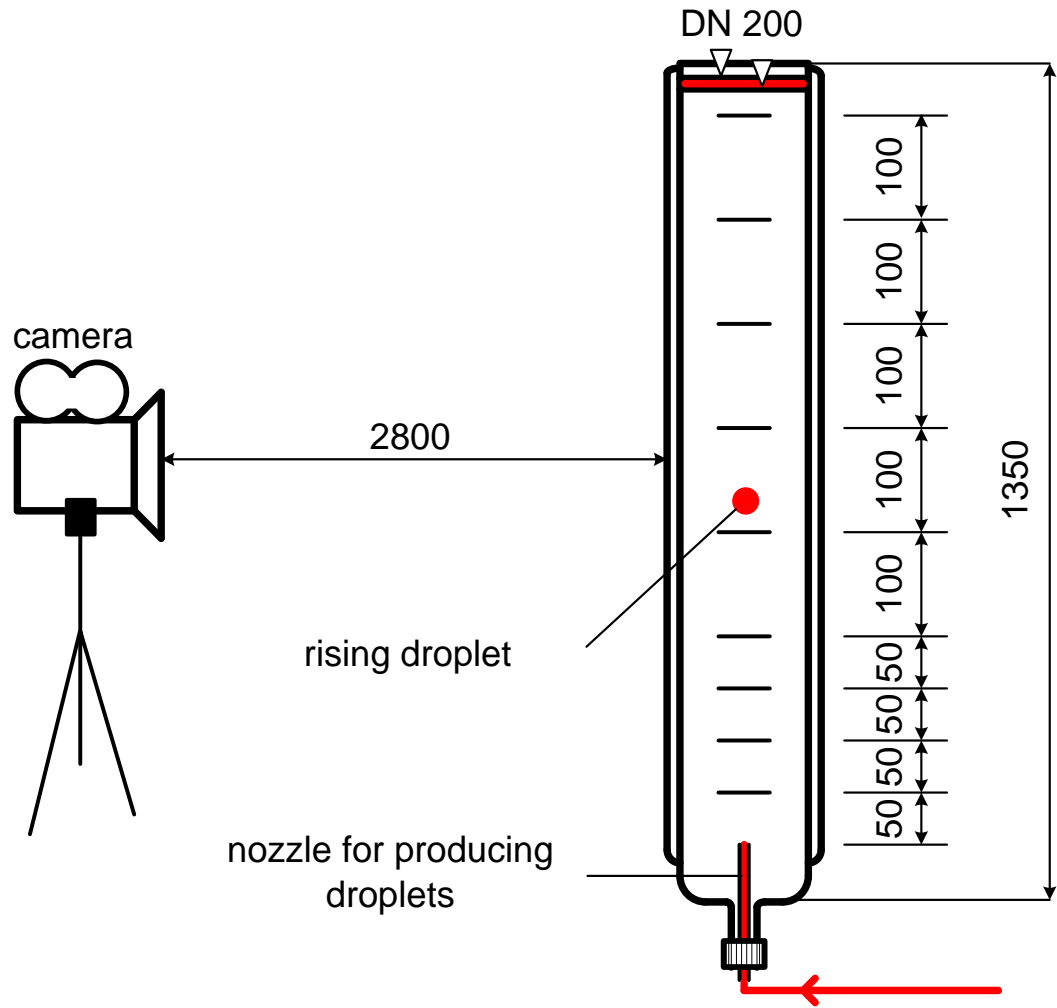
the ReDrop concept



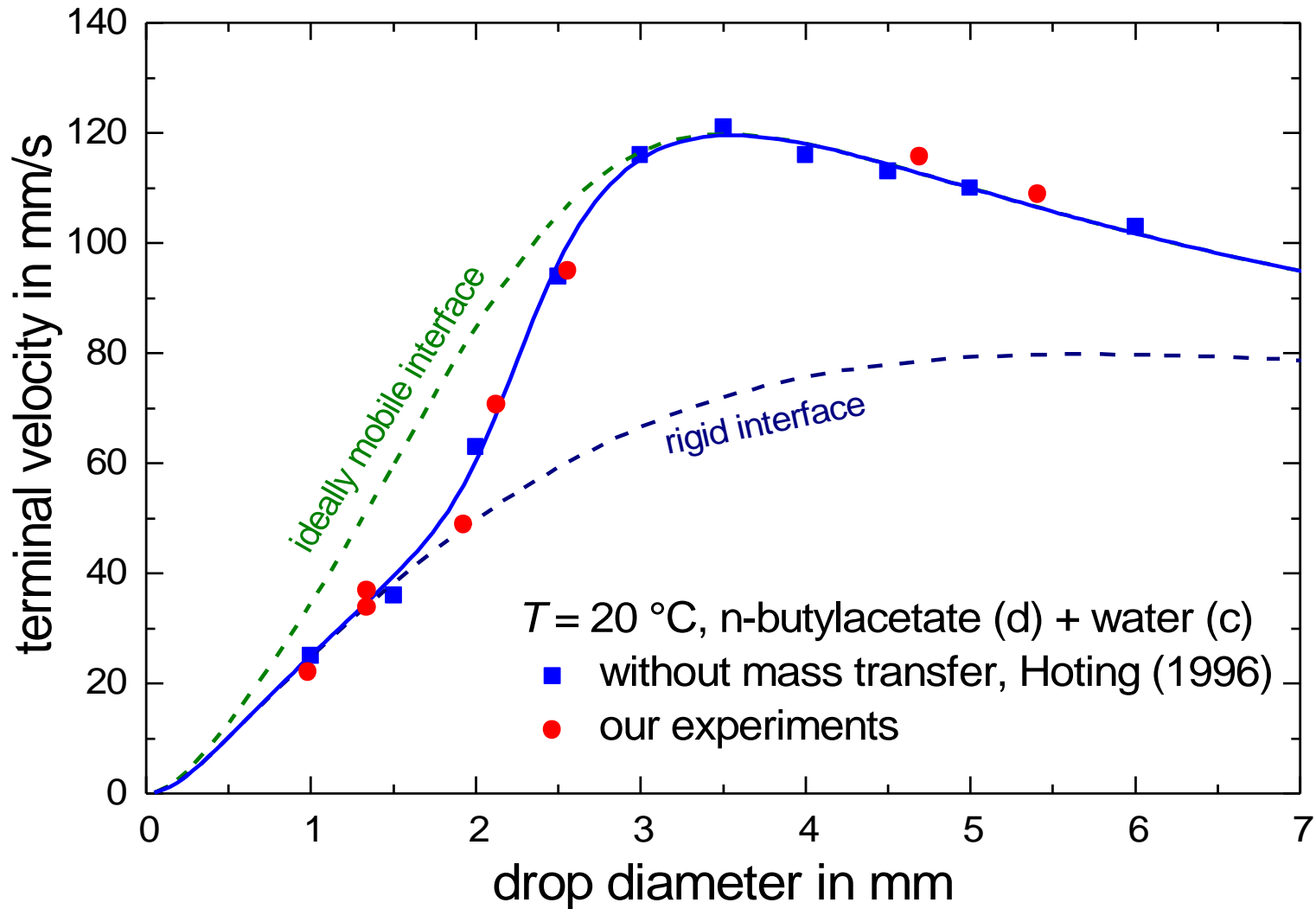
ReDrop simulation



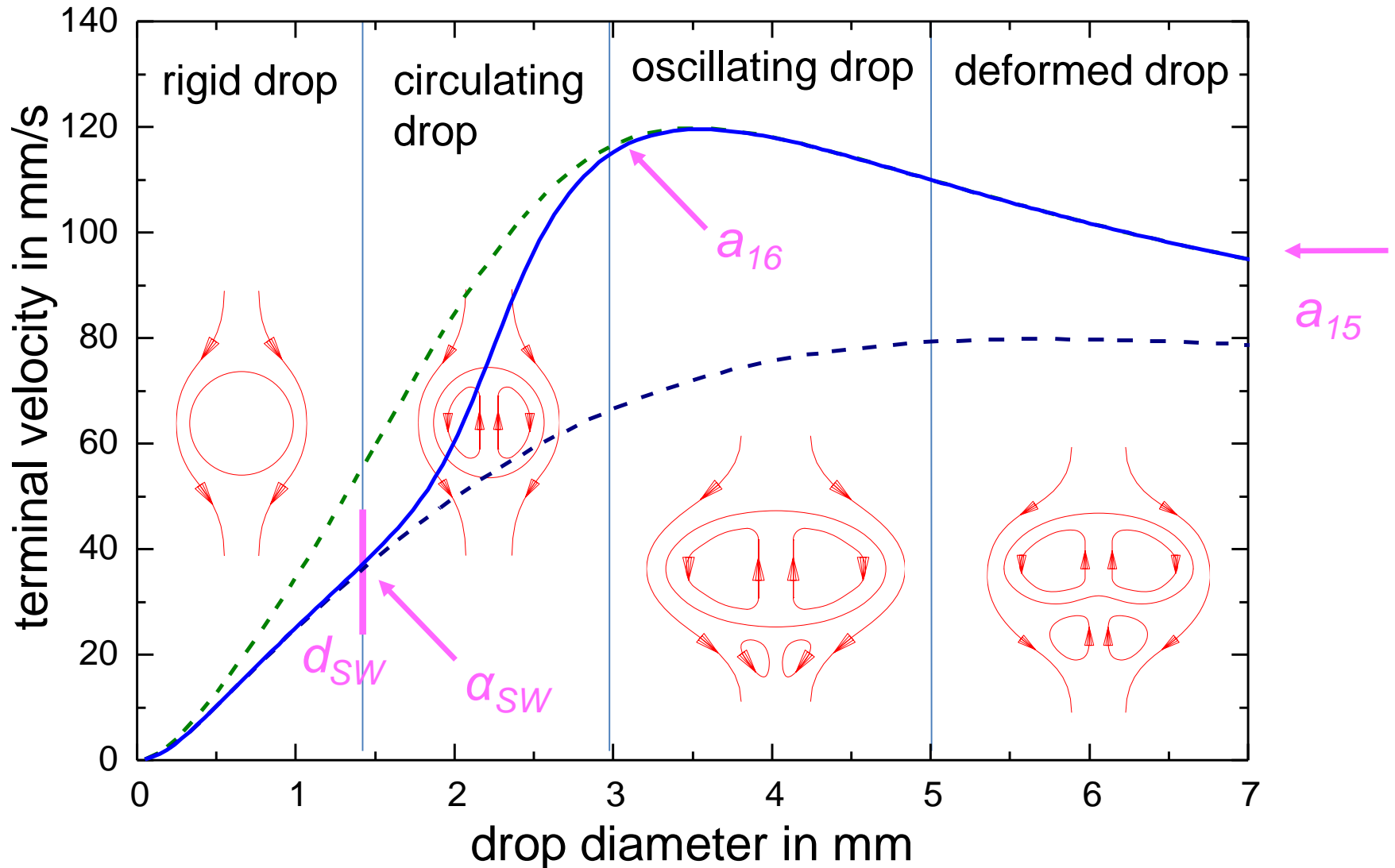
single-drop sedimentation



sedimentation EFCE system



single-drop sedimentation



single-drop sedimentation

4 adjustable parameters: d_{SW} a_{15} a_{16} α_{SW}

	system	α_{SW}
Henschke	d: n-butyl acetate c: water	10
Kalem et al.	d: isododecane + D2EHPA c: water + Zn + H2SO4	2
Adinata	d: toluene + paraffin c: water + PEG	5

increasing viscosity of EFCE system

continuous phase

dispersed phase

water

n-butyl acetate

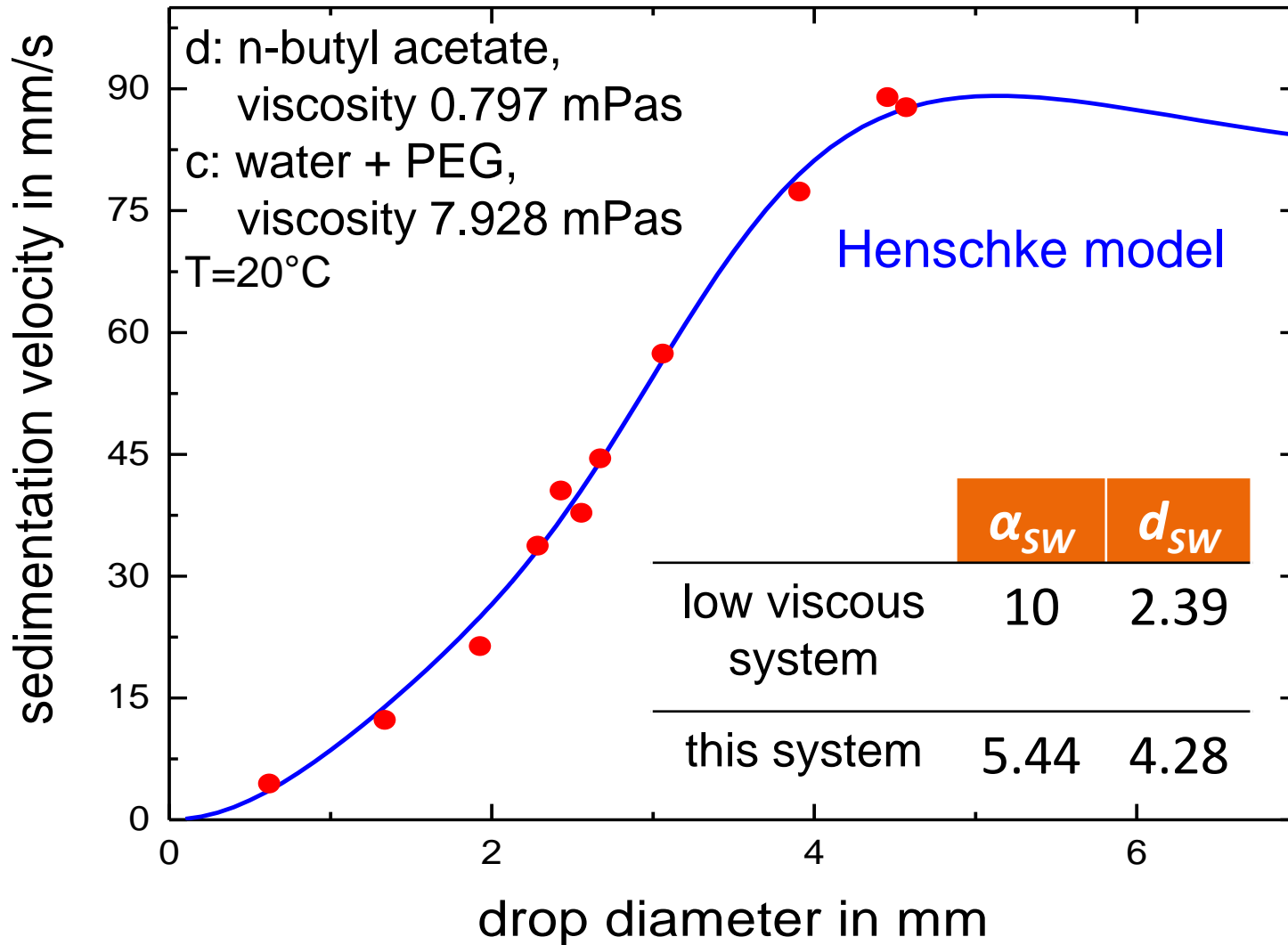
+ polyethylene glycol
(PEG)

+ paraffin oil

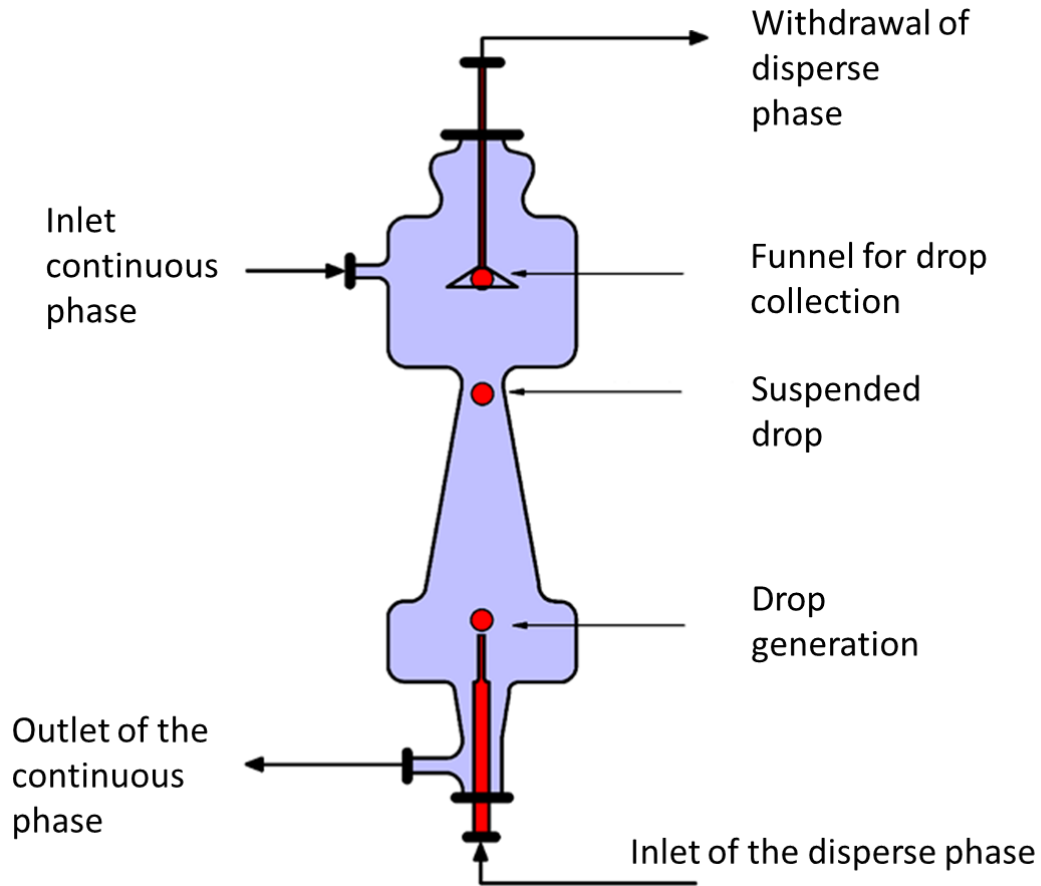
acetone



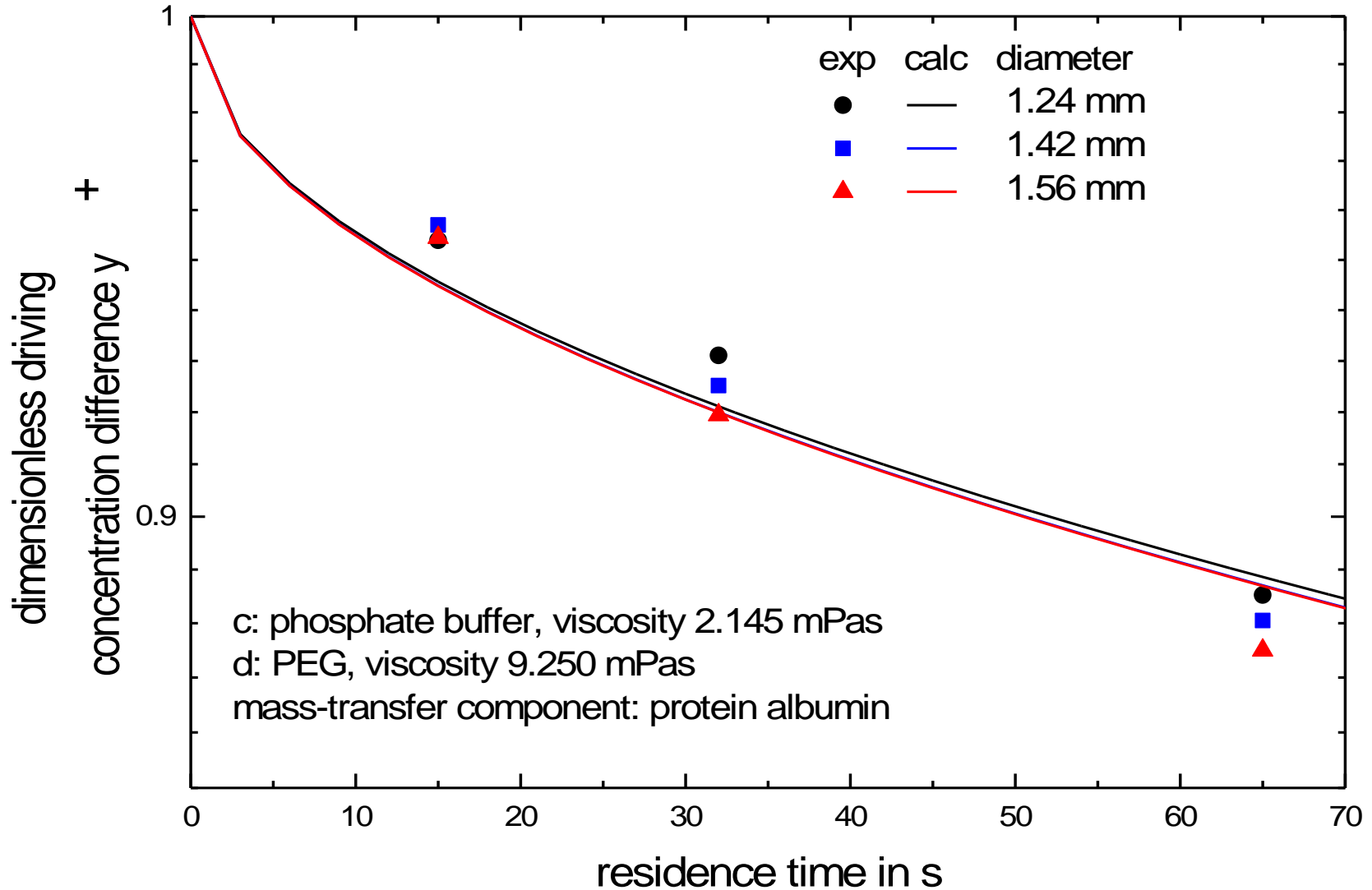
sedimentation velocity



single-drop mass transfer



ATPS mass transfer



conclusions and perspectives

- viscosity influence on mass transfer
- fitting of models parameter

- further investigation of viscosity dependency
- implementing adapted models in simulation

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