Influence of Ions on the Coalescence Behavior

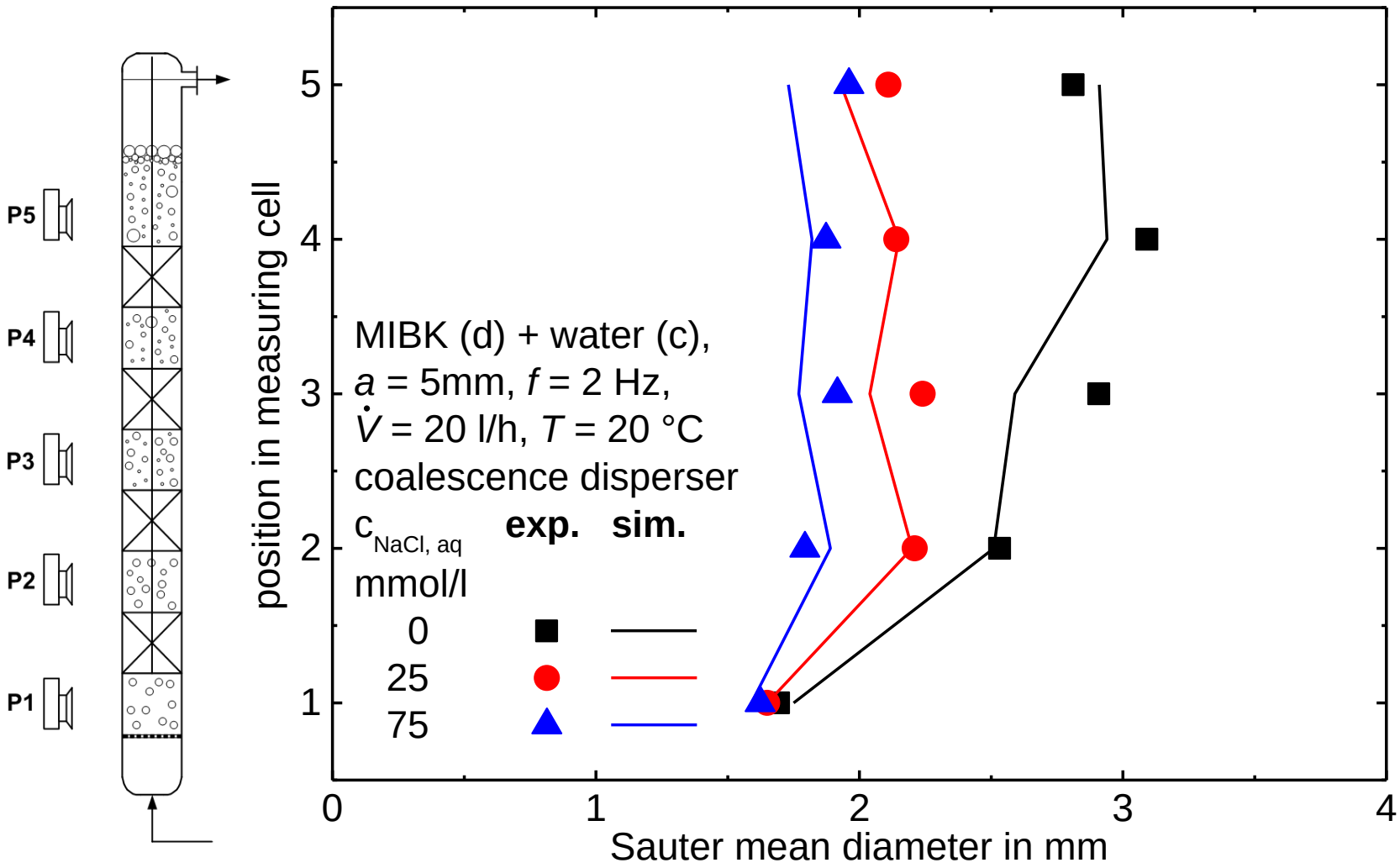
phoenix project
Horizon 2020

David Leleu, Andreas Pfennig
dleleu@uliege.be
Products, Environment, and Processes (PEPs)
Department of Chemical Engineering
Université de Liège
www.chemeng.uliege.be/Pfennig

PEPs
CHEMICAL ENGINEERING

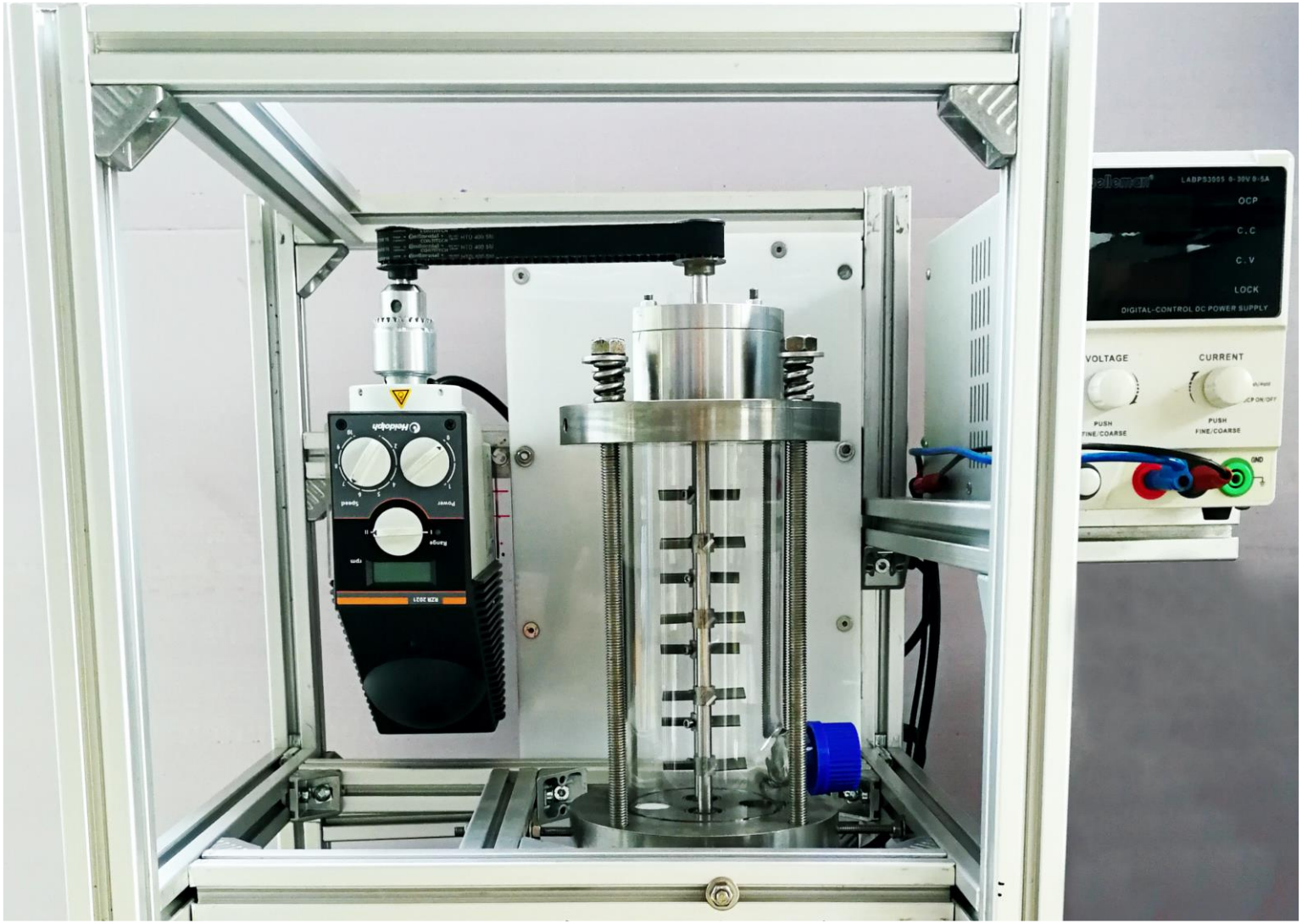
LIÈGE université 200

change due to trace components

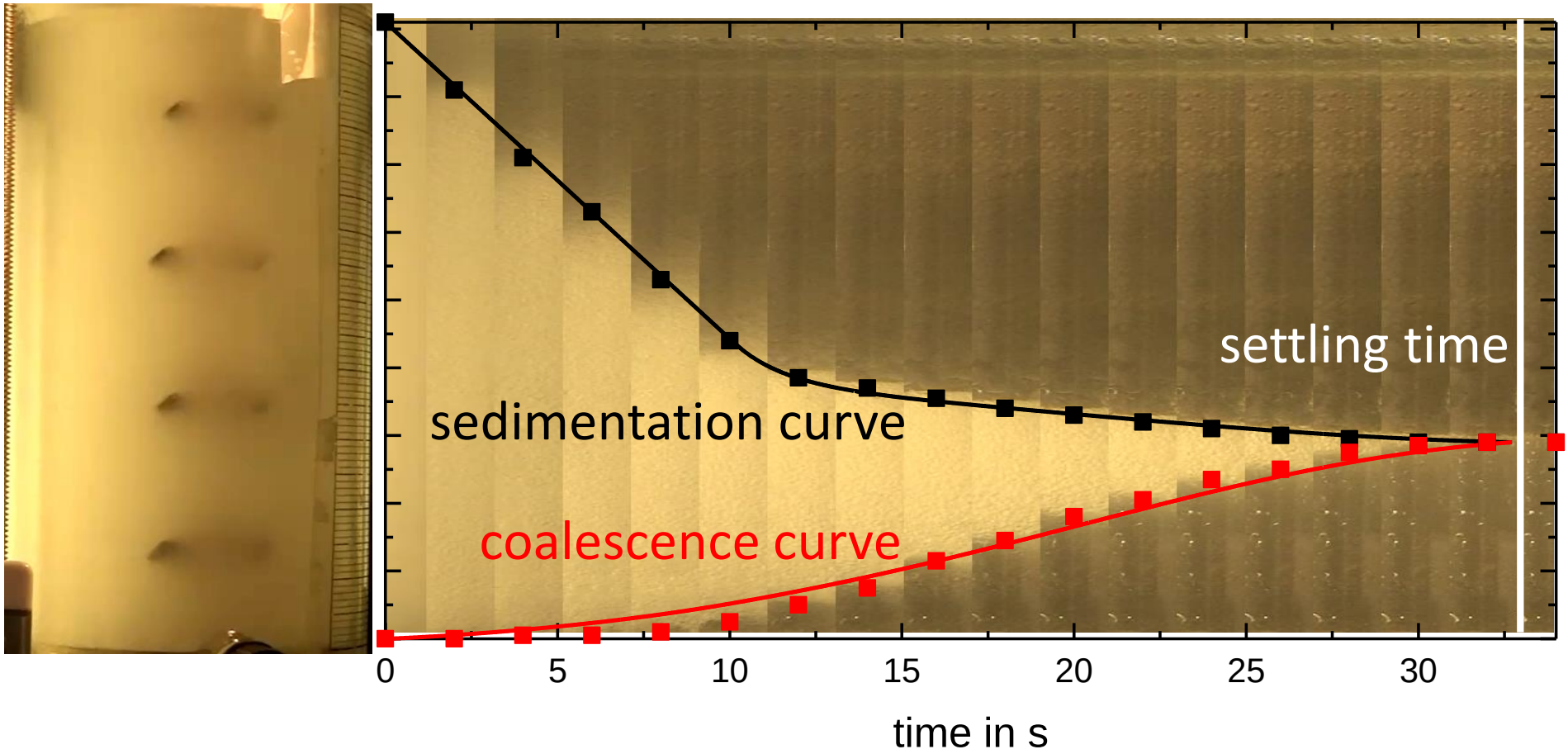


technical equipment

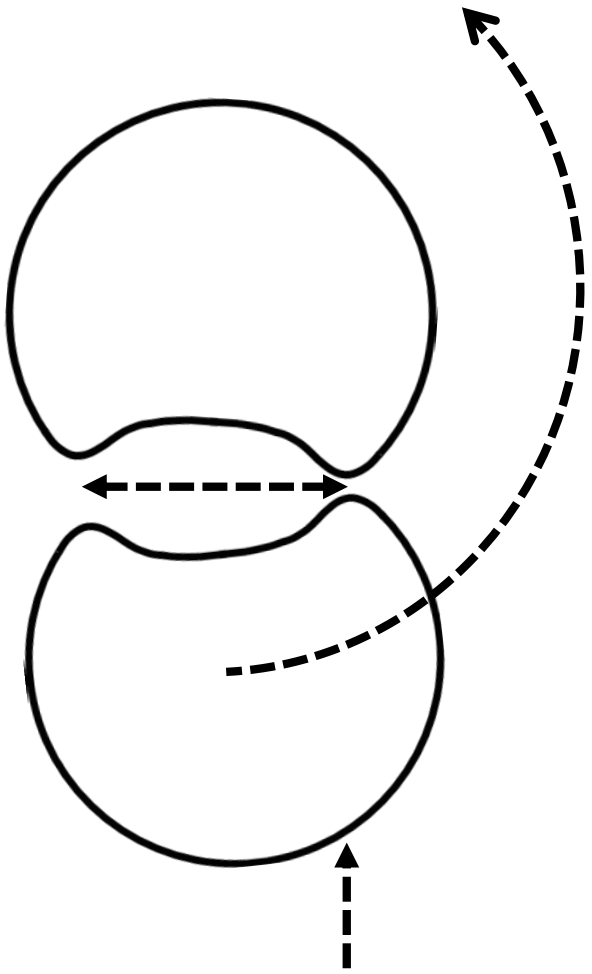
stirring cell



stirring-cell experiment



Coalescence model



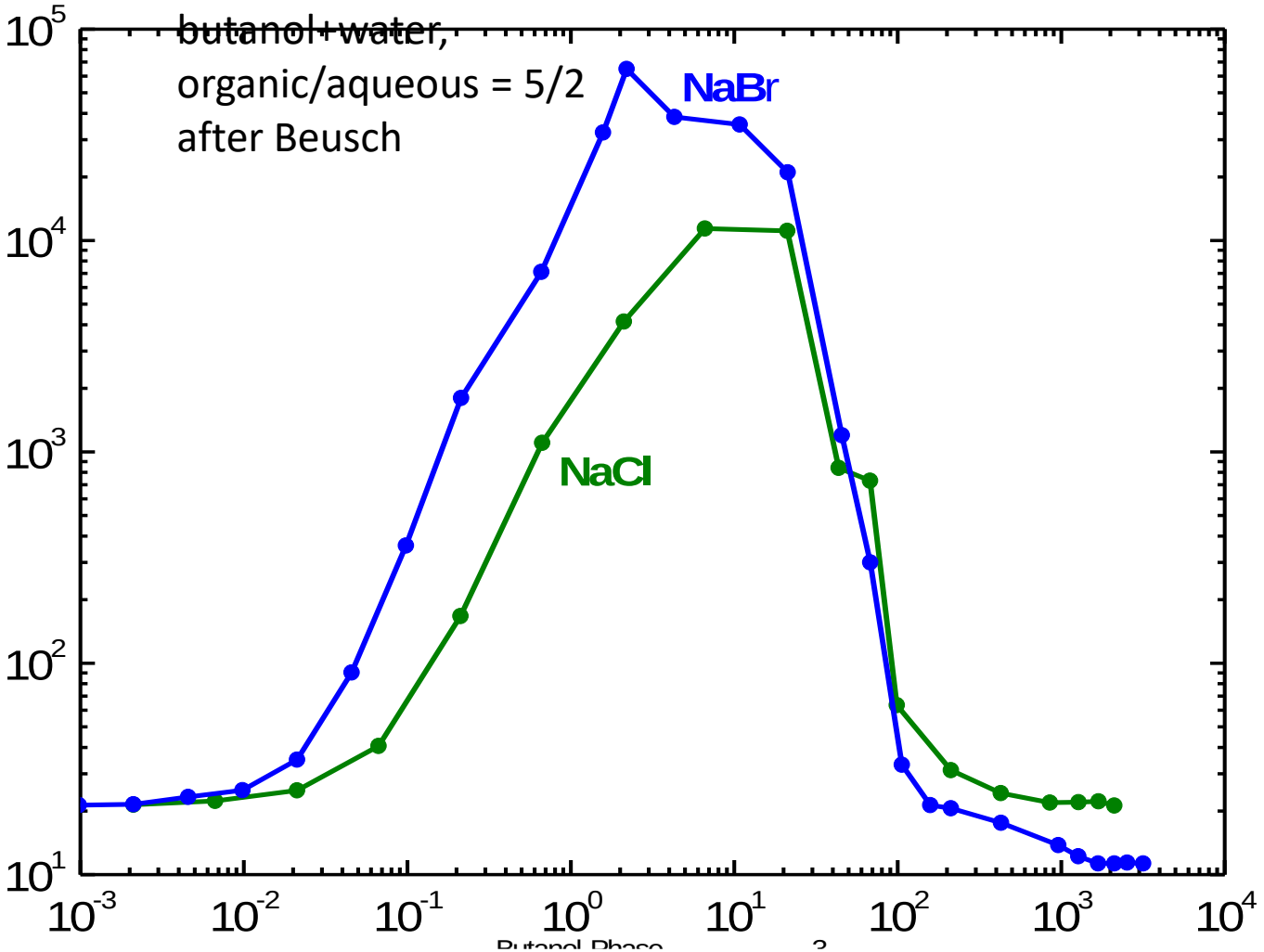
$$p_{coal} = 1 - \exp\left(-\frac{t_{contact}}{t_{coal}}\right)$$

$$t_{contact} \propto \frac{(d_1 + d_2)}{v_{relative}}$$

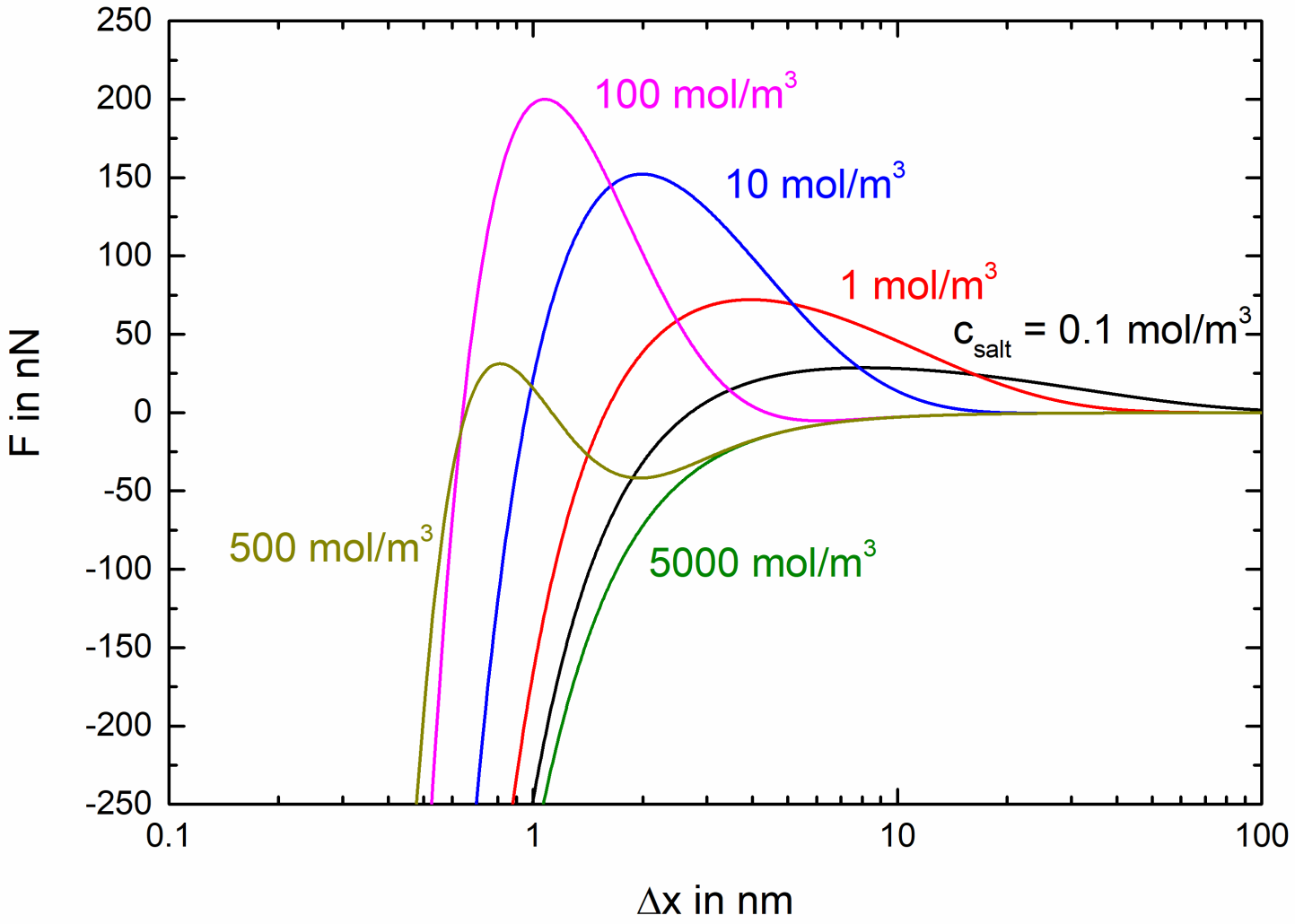
$$\text{dimple} \propto \begin{cases} \text{drops diameter} \\ \text{deformed drops dimension} \end{cases}$$

$$F_{driving} = \begin{cases} F_{buoyancy} \\ F_{turbulences} \\ F_{hydrostatic\_pressure} \end{cases}$$

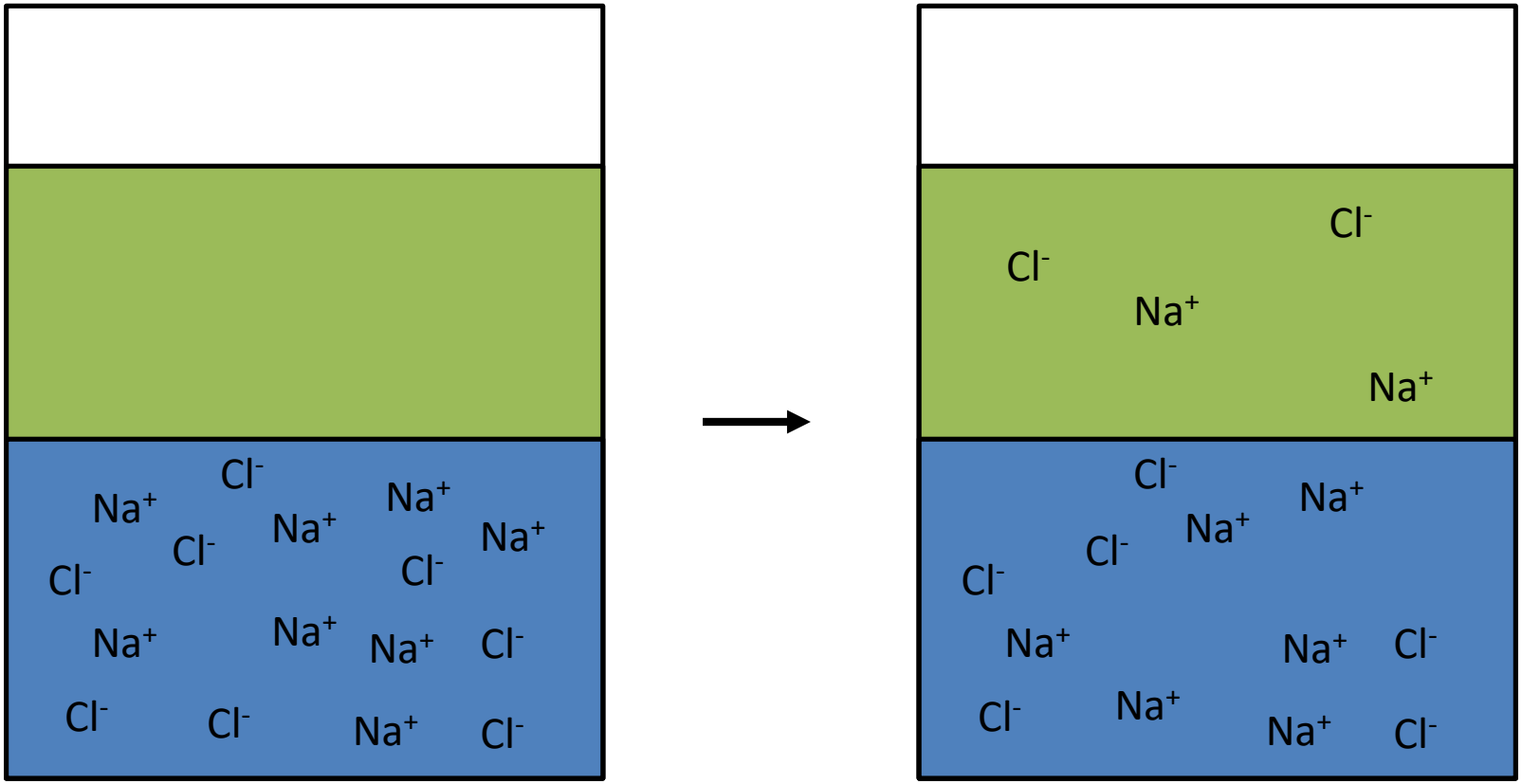
Settling times with salts added



Salt influence on the coalescence



ions partitions: one single salt

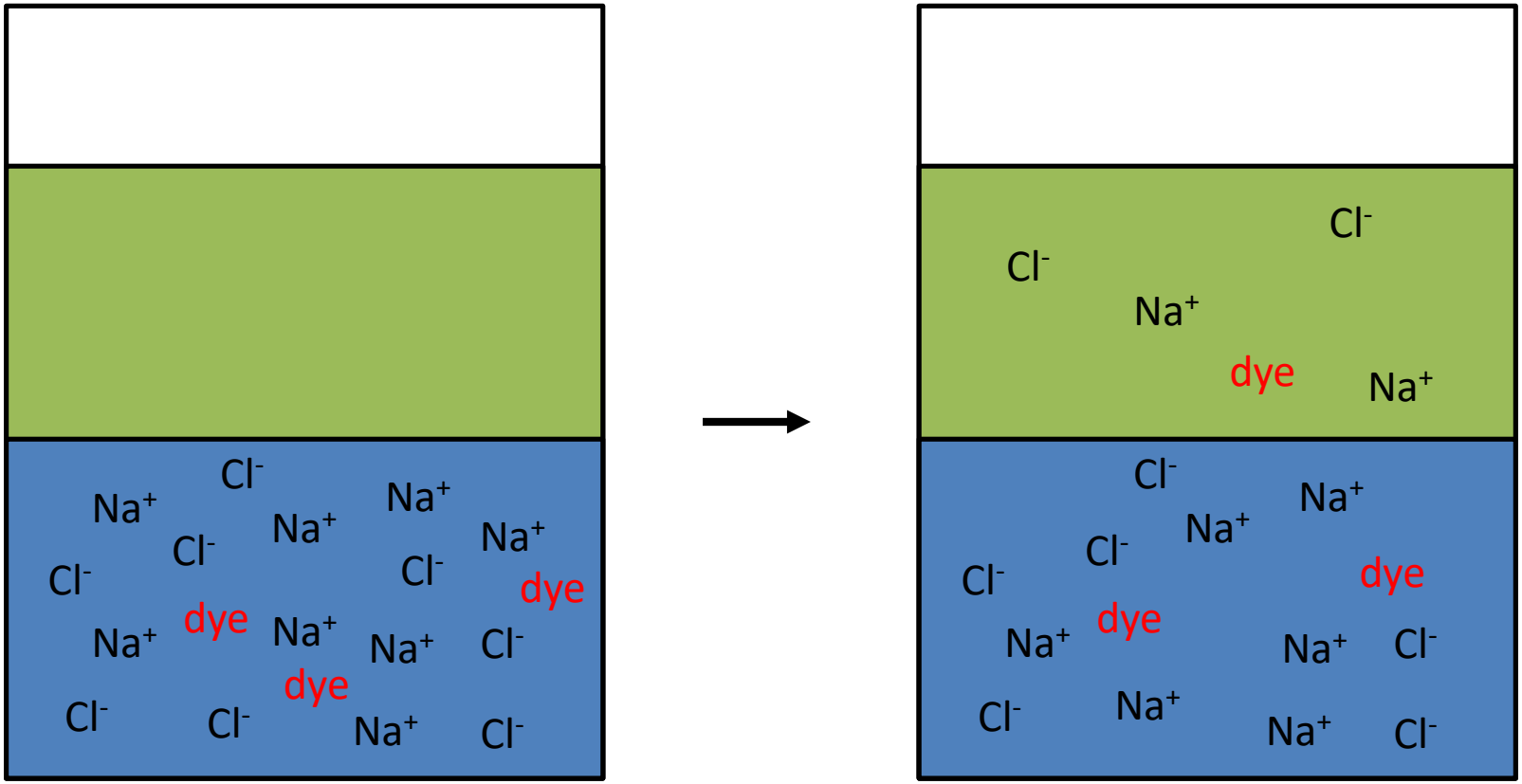


Albertsson model

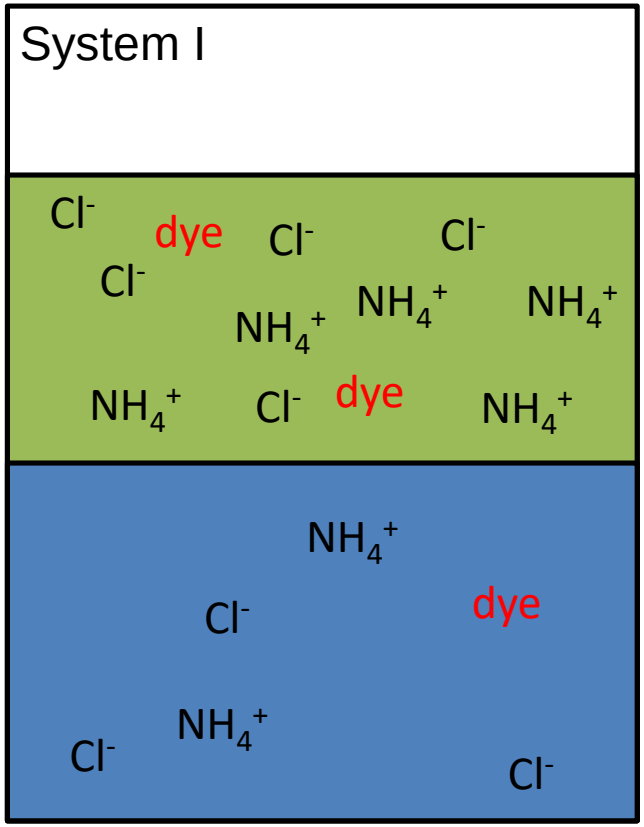
$$\ln K_i = \ln K_i^0 - \frac{z_i F}{RT}\Delta\varphi$$

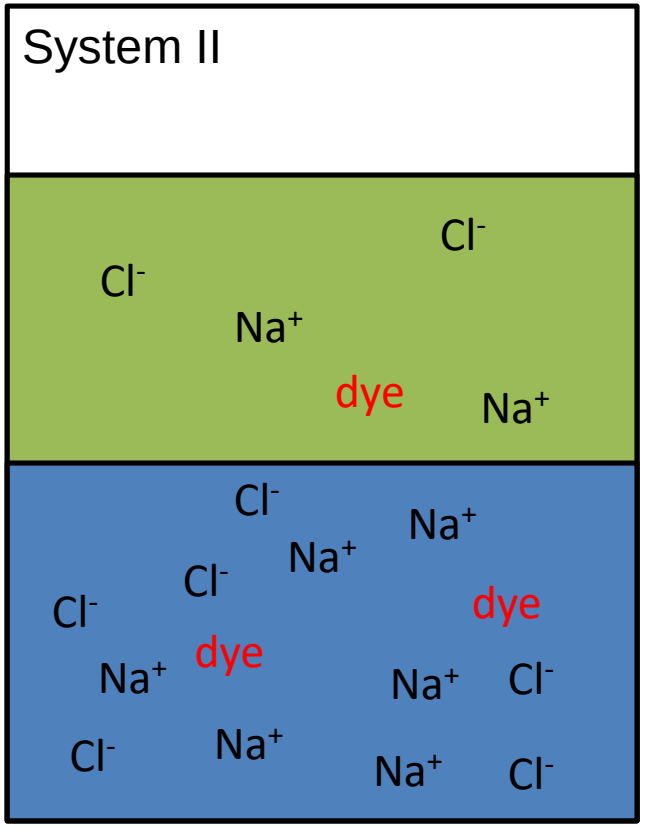
$$\Delta\varphi = \frac{RT}{(z_B - z_A)F}\ln\frac{K_A^0}{K_B^0}$$

electrostatic potential measurement



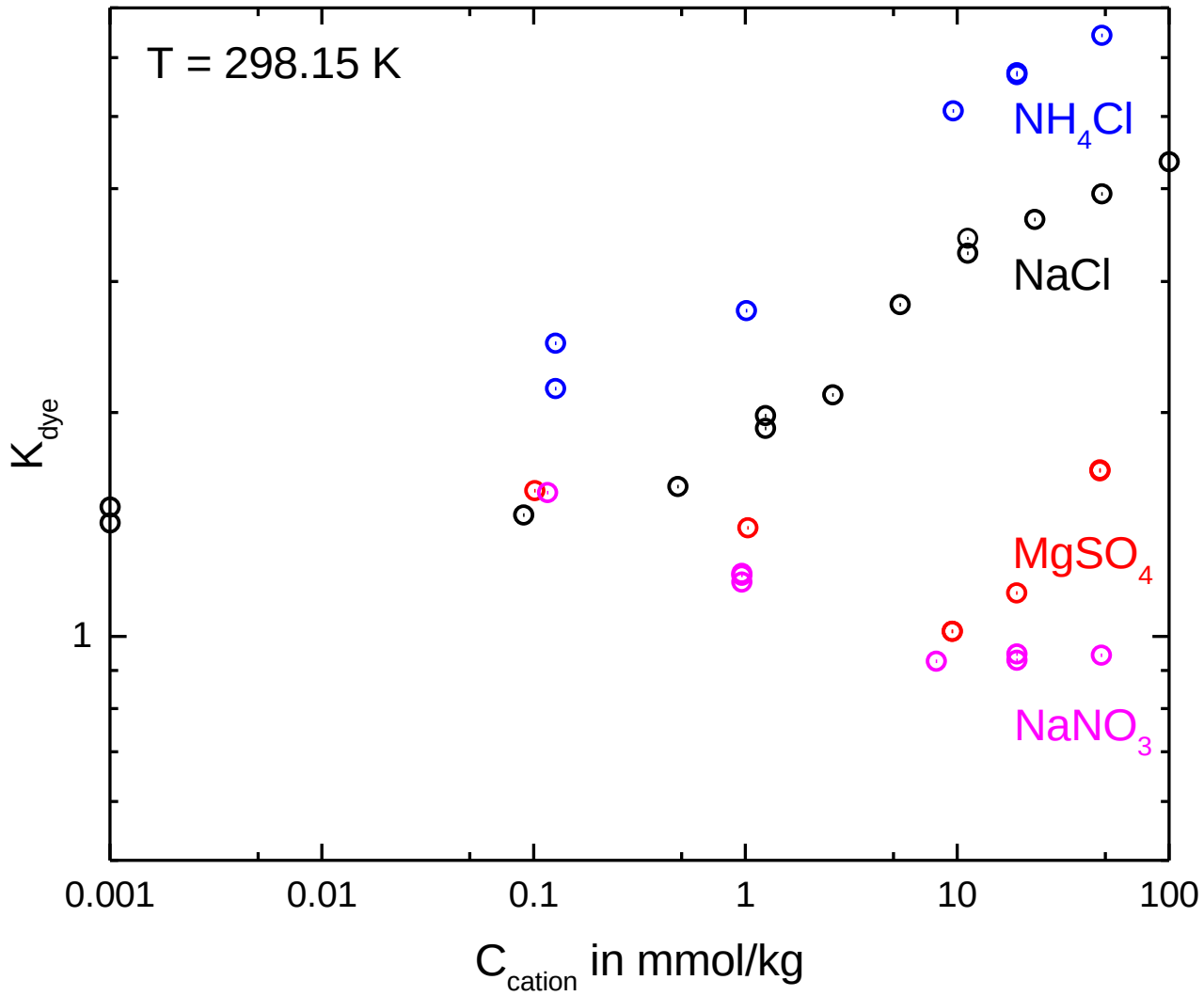
Albertsson model



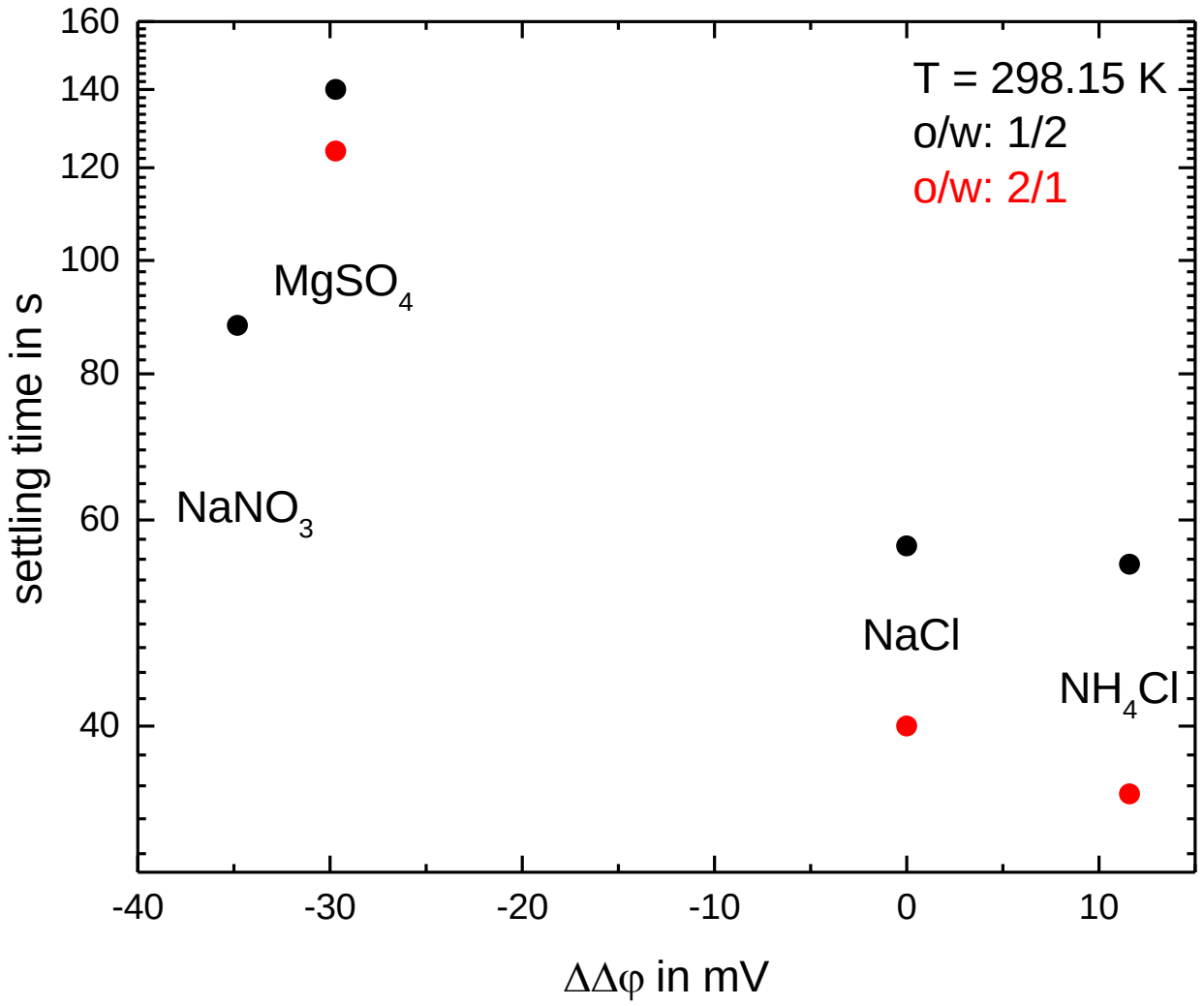


$$\Delta\Delta\varphi = -\frac{RT}{z_{dye}F}\ln\frac{K^{I}_{dye}}{K^{II}_{dye}}$$

experimental data: partition coefficient



salt influence on the settling behavior



Influence of Ions on the Coalescence Behavior

phoenix project
Horizon 2020

David Leleu, Andreas Pfennig
dleleu@uliege.be
Products, Environment, and Processes (PEPs)
Department of Chemical Engineering
Université de Liège
www.chemeng.uliege.be/Pfennig

PEPs
CHEMICAL ENGINEERING

LIÈGE université 200