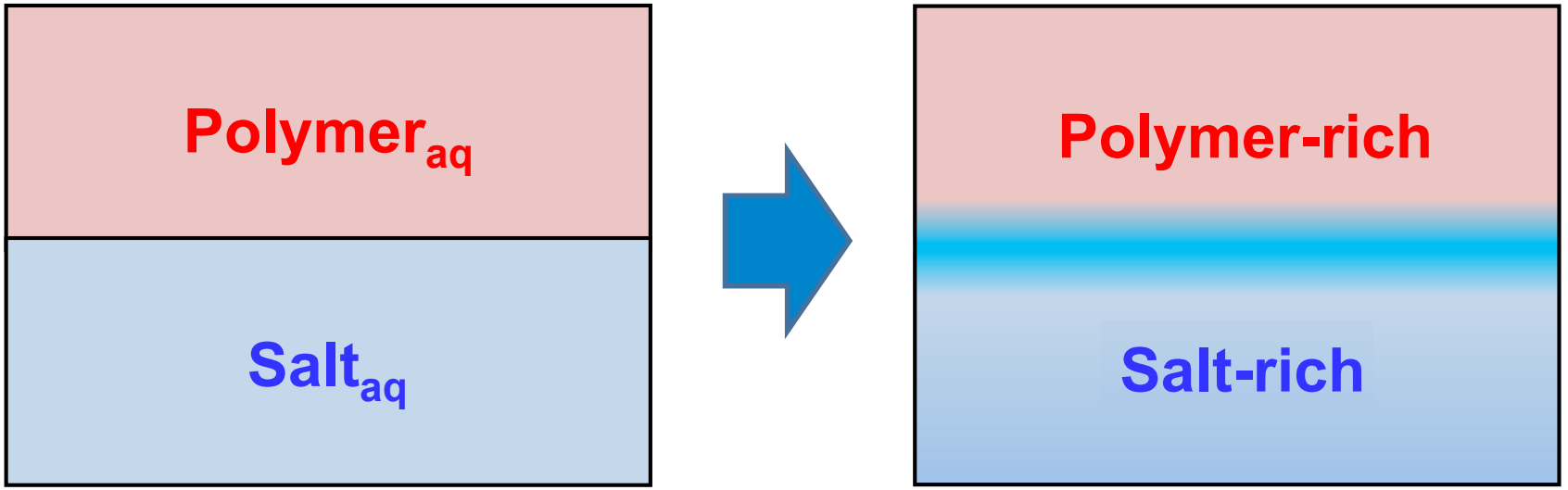
Introduction (Korteweg force)

Mutual soluble liquids system



Concentration gradient → Surface energy → Convection

Korteweg effect

$$\boldsymbol{F} = \left(\frac{\rho RT}{M_W}\right)\mu\nabla\phi$$

M_W : molecular weight　　R : gas constant　　T : temperature
μ : chemical potential　　ϕ : molar fraction

Introduction (Korteweg force)

Korteweg force

$$F = \frac{\rho RT}{M_w} \mu \nabla \varphi$$

M_w : molecular weight of species A

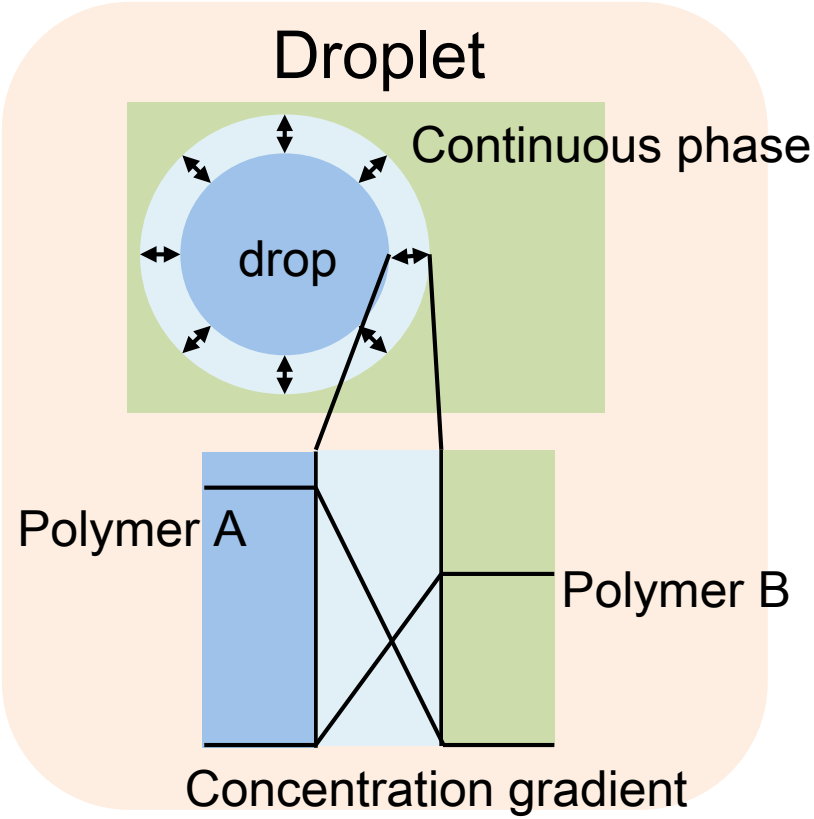
R : gas constant

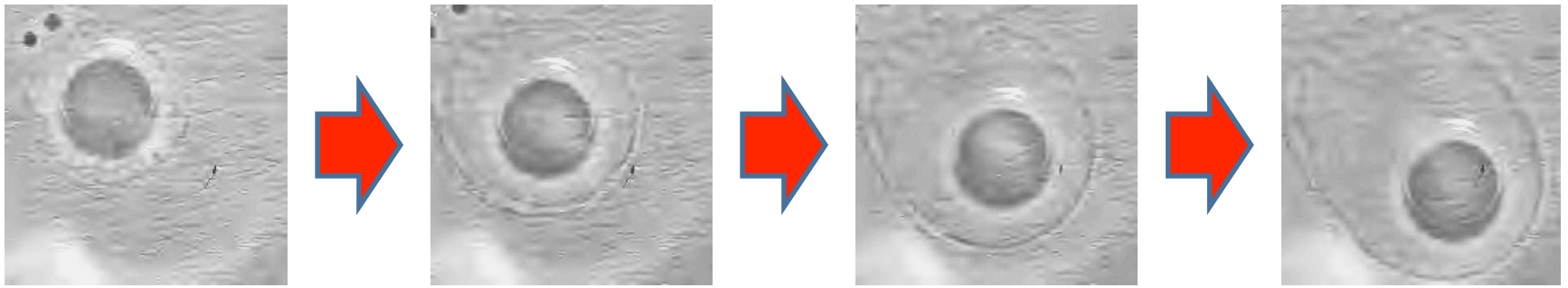
T : temperature

μ : chemical potential

ρ : mixture molar density

φ : molar fraction of species A

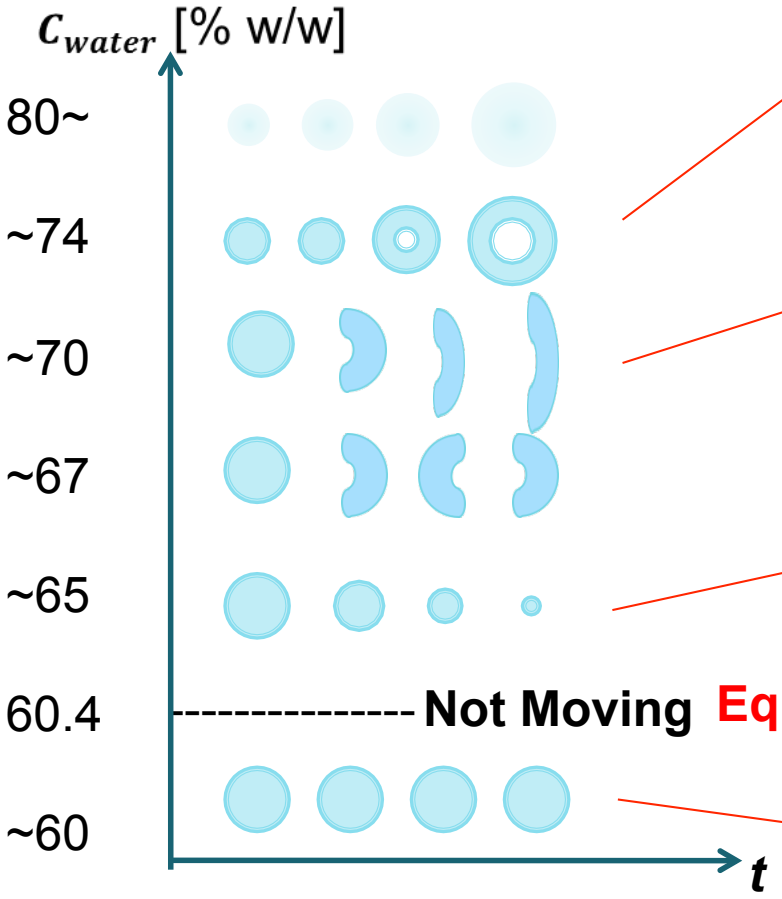


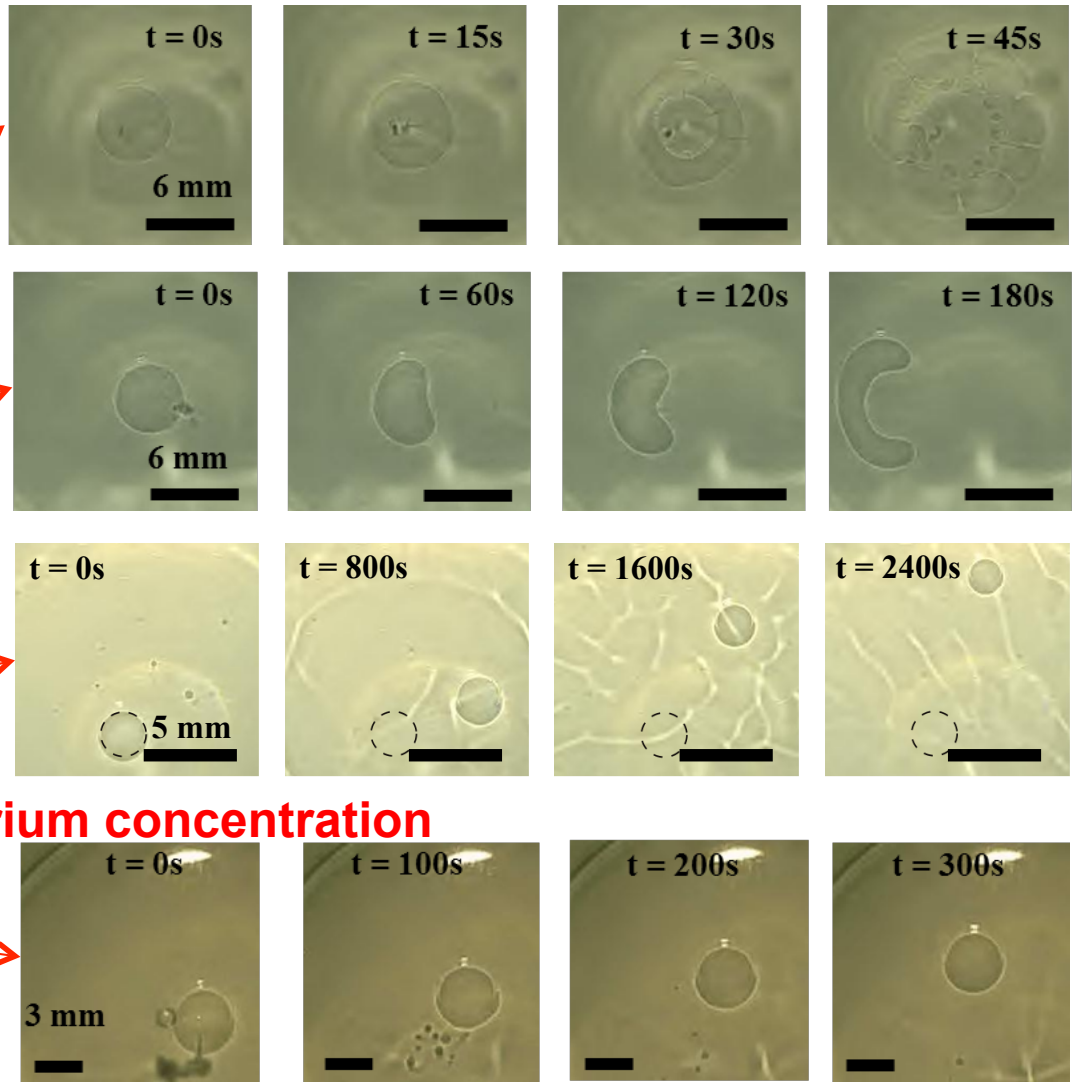


Behavior of droplet

Korteweg force → Convection → Composition-dependent movement

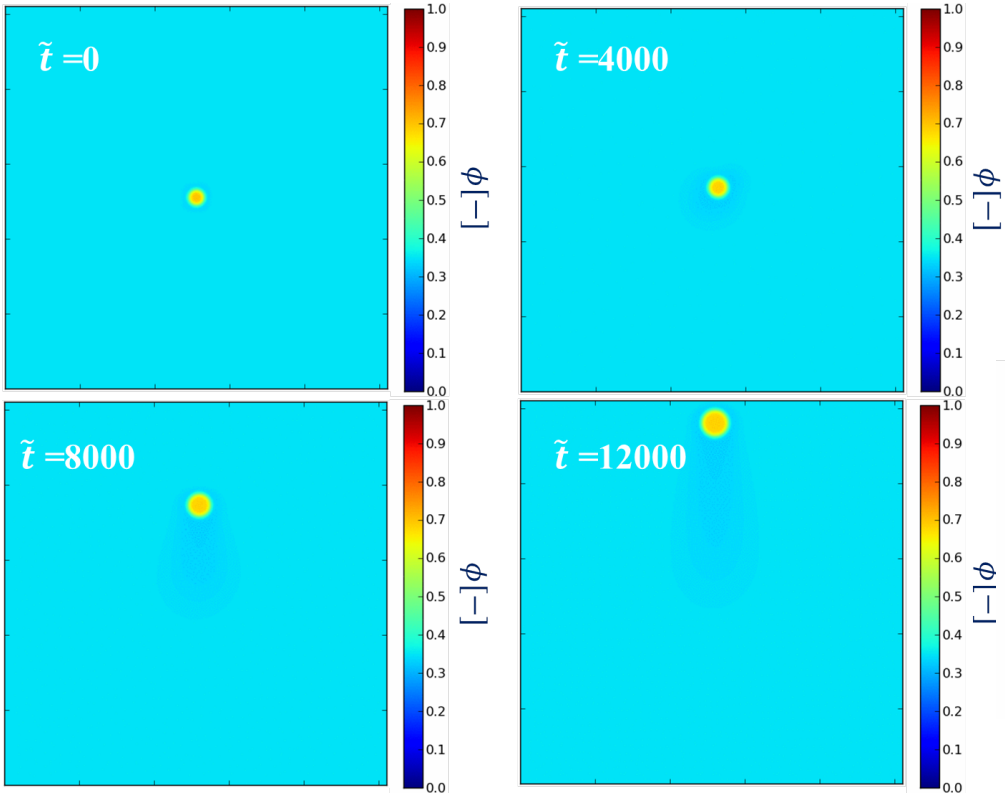
PEG8000-Na_2SO_4 system

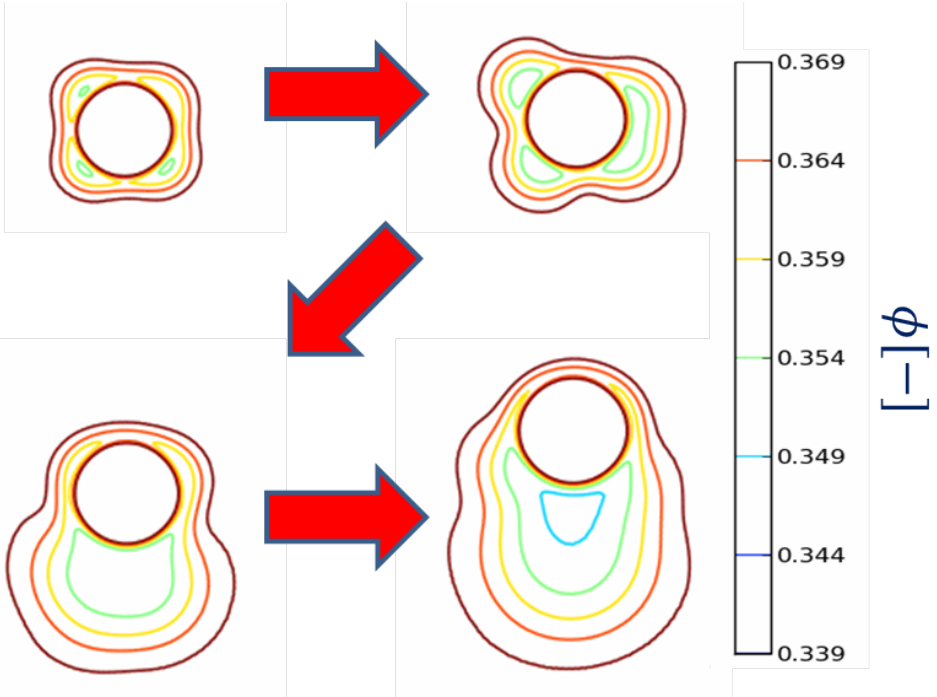




Result of simulation

$\phi_{cont} > \phi_{eq}$ **Without deformation**

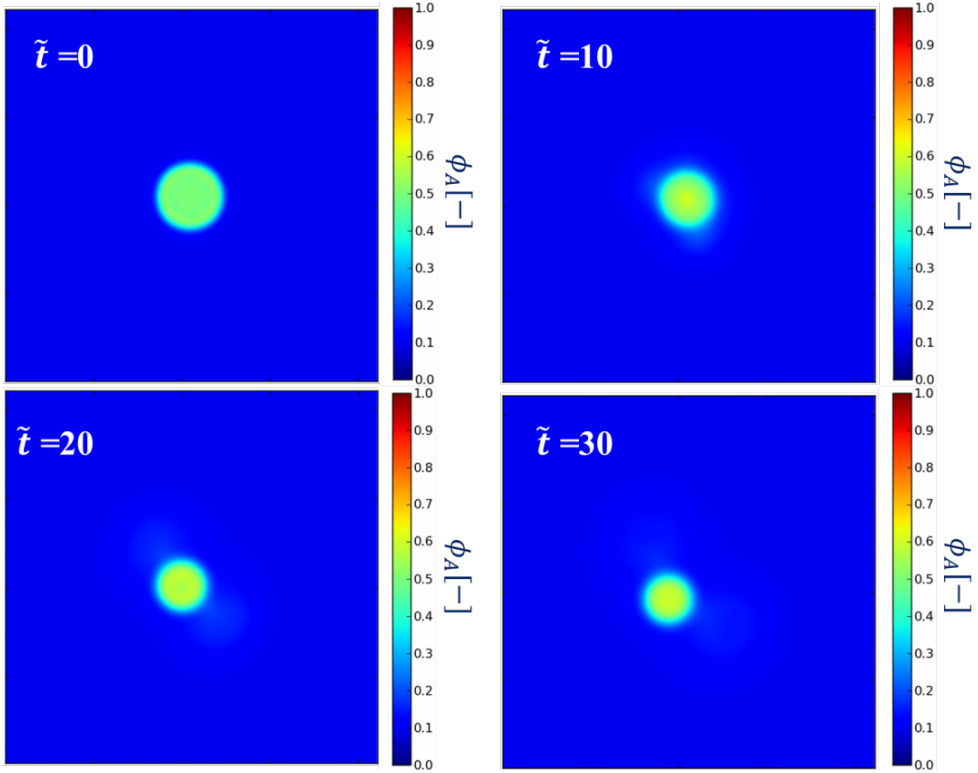




Result of simulation

$$\phi_{cont} < \phi_{eq}$$

Shrink with motion



Deformation