

Dimensionless Parameters in Rheology [p1n91]

□ **Deborah number:** $\text{De} = \frac{\tau}{\tau_f}$

- τ : stress relaxation time
- τ_f : time scale of experiment
- $\text{De} \ll 1$: liquid-like soft-matter response
- $\text{De} \gg 1$: solid-like soft-matter response

□ **Weissenberg number:** $\text{Wi} = \dot{\epsilon} \tau$

- τ : stress relaxation time
- $\dot{\epsilon}$: rate of shear strain
- $\text{Wi} \ll 1$: linear soft-matter response
- $\text{Wi} \gg 1$: nonlinear soft-matter response

□ **Peclet number:** $\text{Pe} = \dot{\epsilon} \tau_D = \frac{\dot{\epsilon}}{\dot{\epsilon}_D}$

- τ_D : diffusive relaxation time
- $\dot{\epsilon}$: advective transport rate (rate of shear strain)
- $\dot{\epsilon}_D$: diffusive transport rate
- $\text{Pe} \ll 1$: soft matter maintains structure during shear flow
- $\text{Pe} \gg 1$: shear flow modifies structure of soft matter