# TXL211
# Lecture 5

$$\langle r^2\rangle_f^{1/2} = n^{1/2} l$$

$$\langle S^2\rangle^{1/2} = \frac{\langle r^2\rangle^{1/2}}{\sqrt{6}}$$

$$\langle r^2\rangle_{fa} = nl^2\left(\frac{1-\cos\theta}{1+\cos\theta}\right)$$

$$\langle r^2\rangle_{ha} = nl^2\left(\frac{1-\cos\theta}{1+\cos\theta}\right)\left(\frac{1+\overline{\cos\phi}}{1-\overline{\cos\phi}}\right)$$

$> 1$

$$\langle r^2\rangle_0 = \sigma^2 nl^2\left(\frac{1-\cos\theta}{1+\cos\theta}\right)$$

$$C_\infty = \langle r^2\rangle_0 / nl^2$$

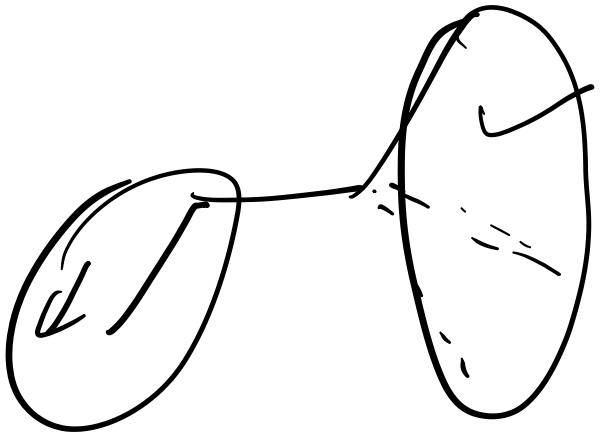
$\sigma^2 \approx 1$

$$\sigma^2 = \frac{\langle r^2\rangle_0}{\langle r^2_{fa}\rangle}$$

UNPERTURBED DIMENSIONS

$\sigma = .5 - 2.0$

SHORT RANGE INTERACTIONS

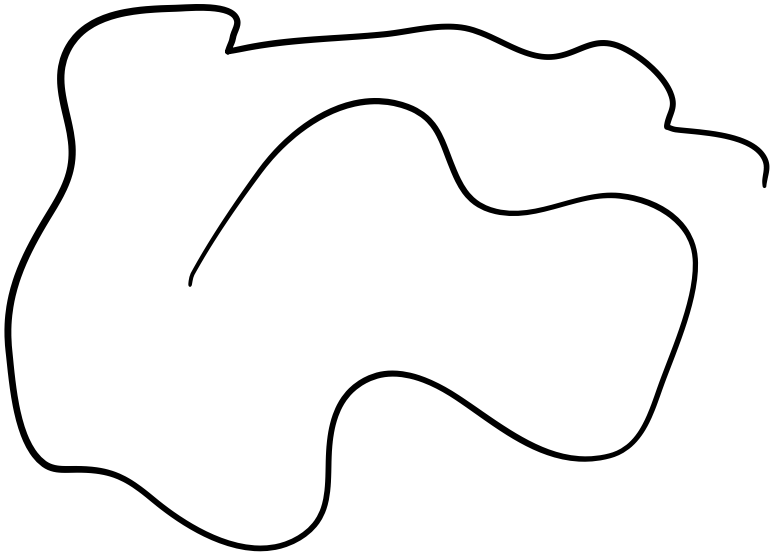


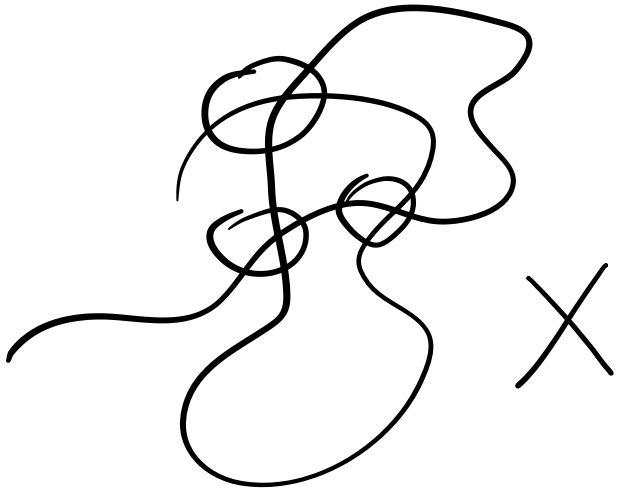
$\langle F^2 \rangle_0$

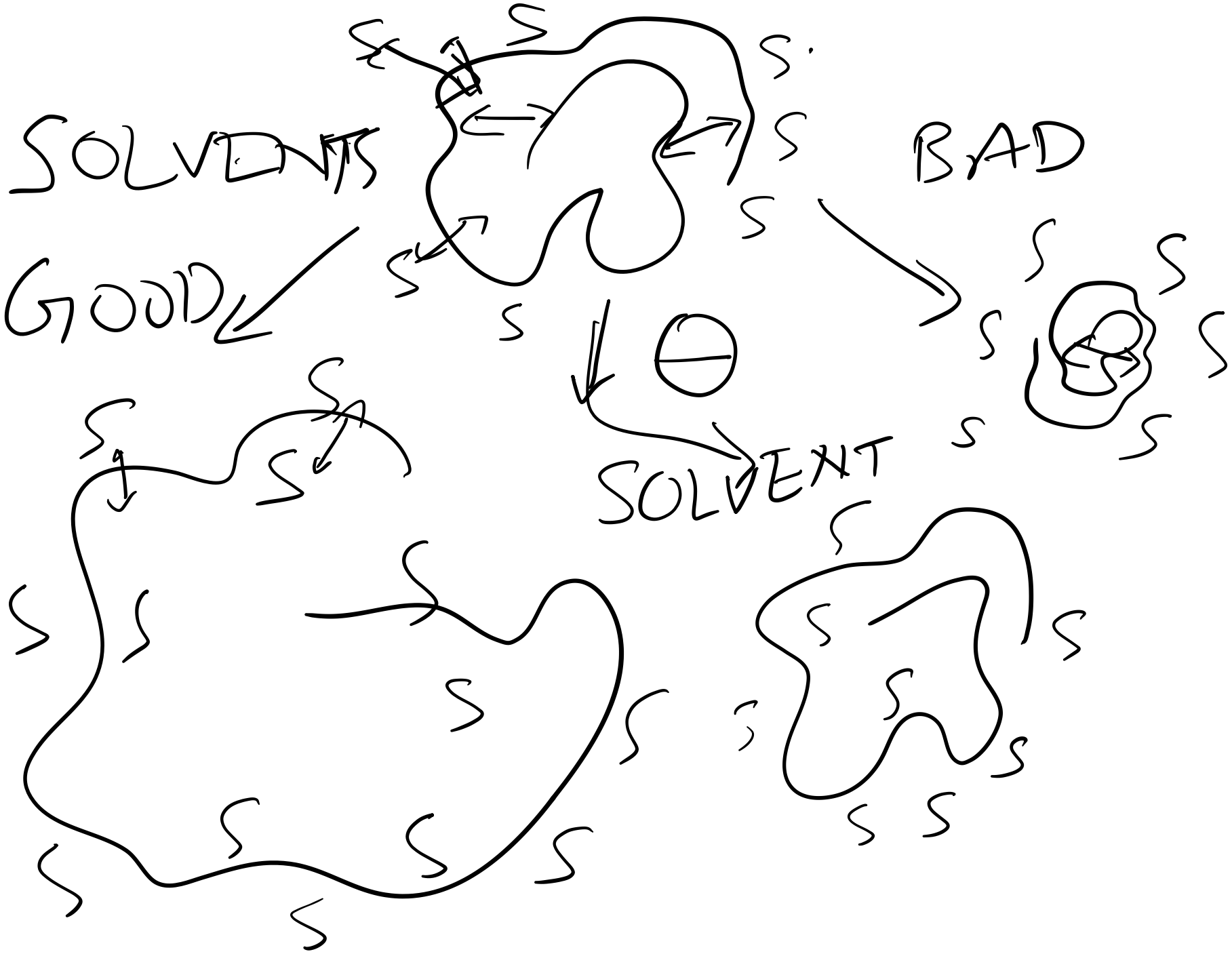
$\Downarrow$

LARGE RANGE INTERACTIONS

- EXCLUDED VOLUME






SOLVENTS
GOOD
BAD
SOLVENT

$$\langle \vec{r} \rangle^{1/2} = \alpha \langle \vec{r}_0^{\,2} \rangle^{1/2}$$

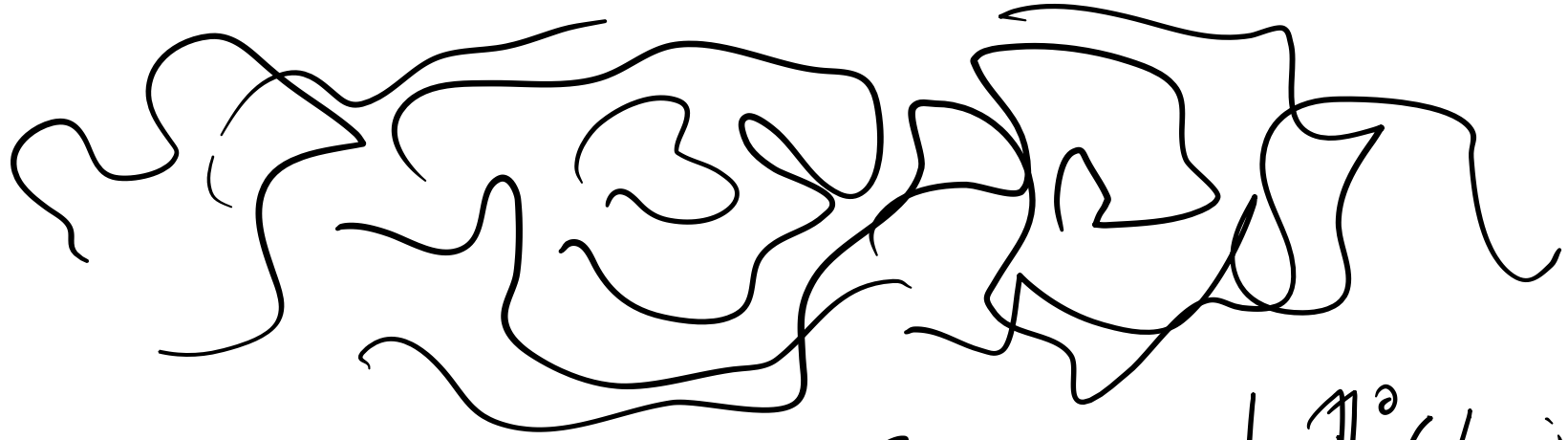
$$\Downarrow$$

EXPANSION FACTOR

GOOD SOLVENT $\alpha > 1$

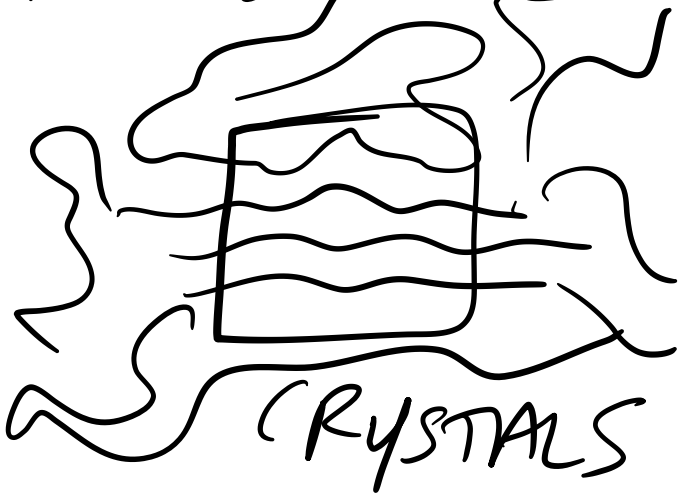
BAD " $\alpha < 1$

$\Theta$ SOLVENT $\alpha = 1$



↓ 1°C/min

SEMI CRYSTALLINE

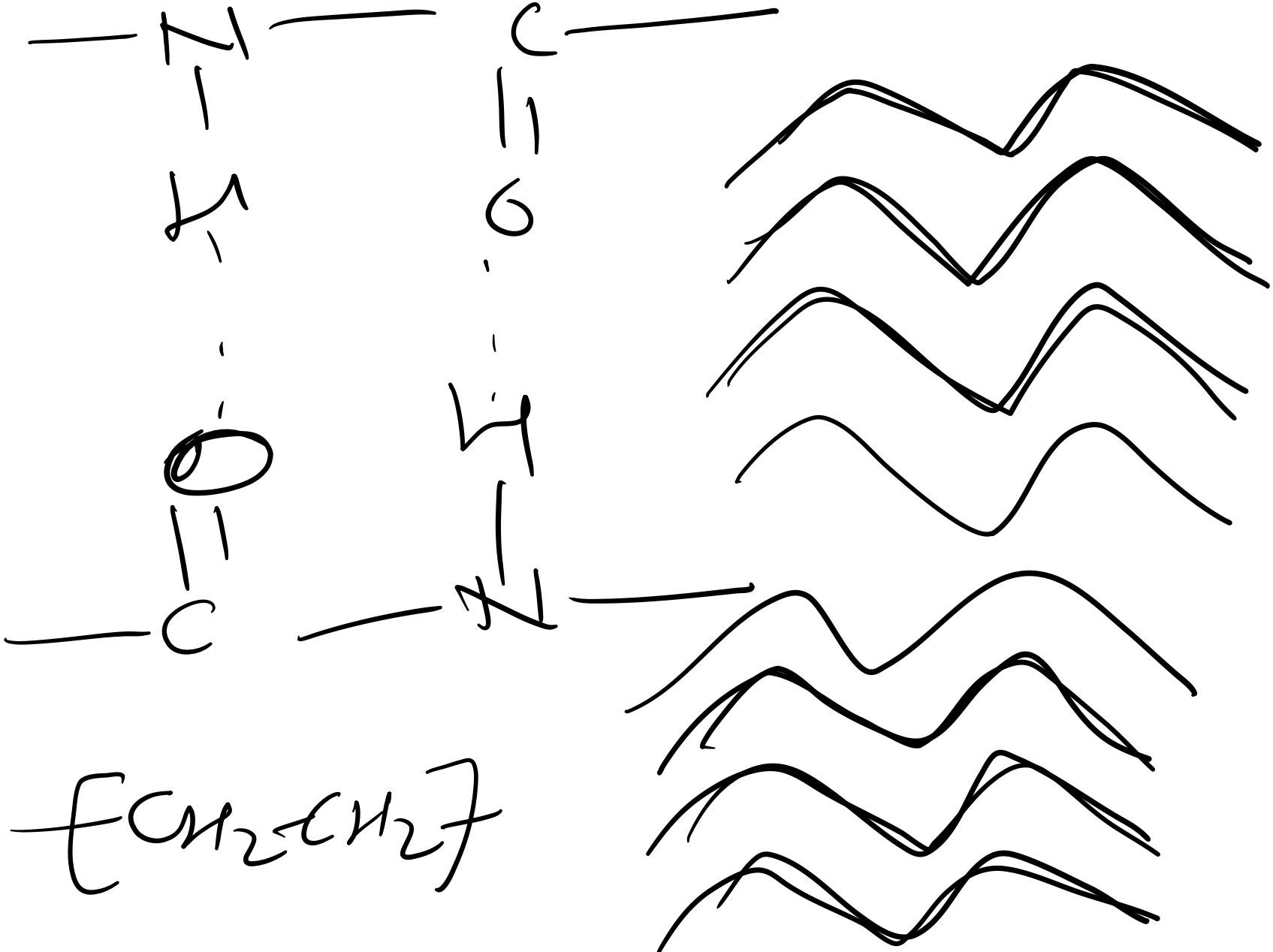


CRYSTALS

— PDI

— SEC. INTER$^N$

100 % AMORPHOUS



SEMI-CRYSTALLINE

⇓

GLASS TRANSITION TEMP

($T_g$)

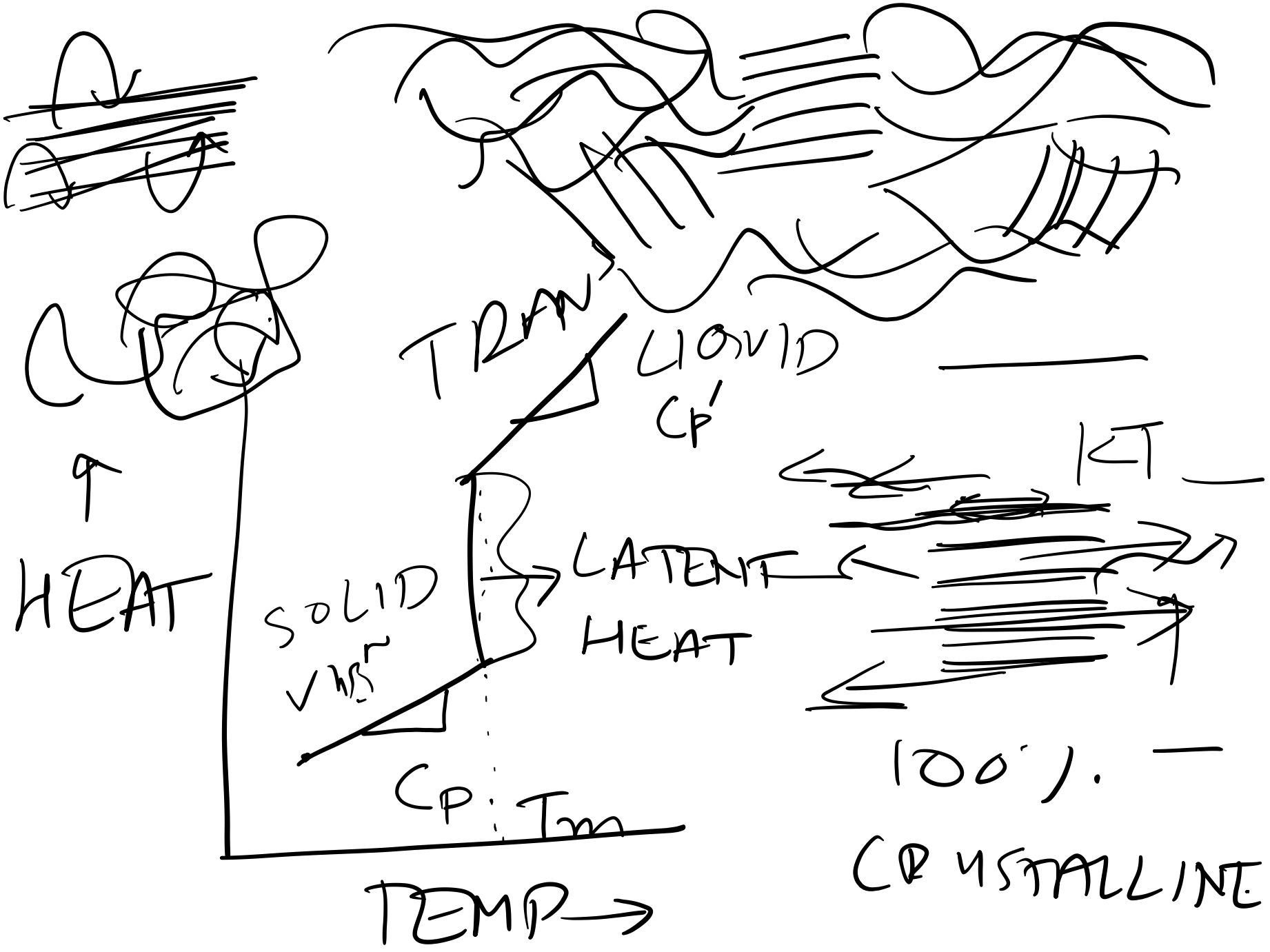
$T < T_g \Rightarrow$ GLASSY

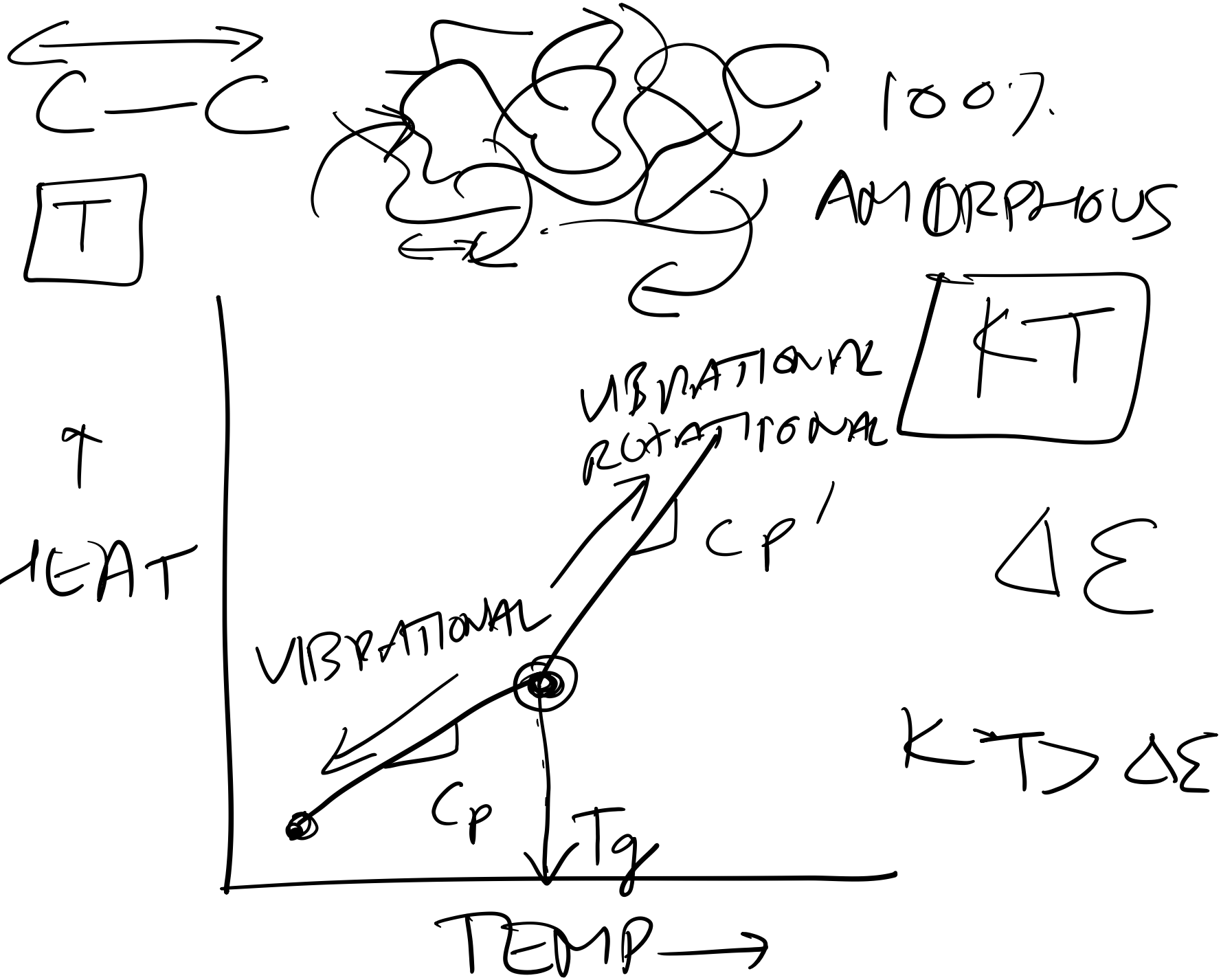
RIGID, BRITTLE

HARD

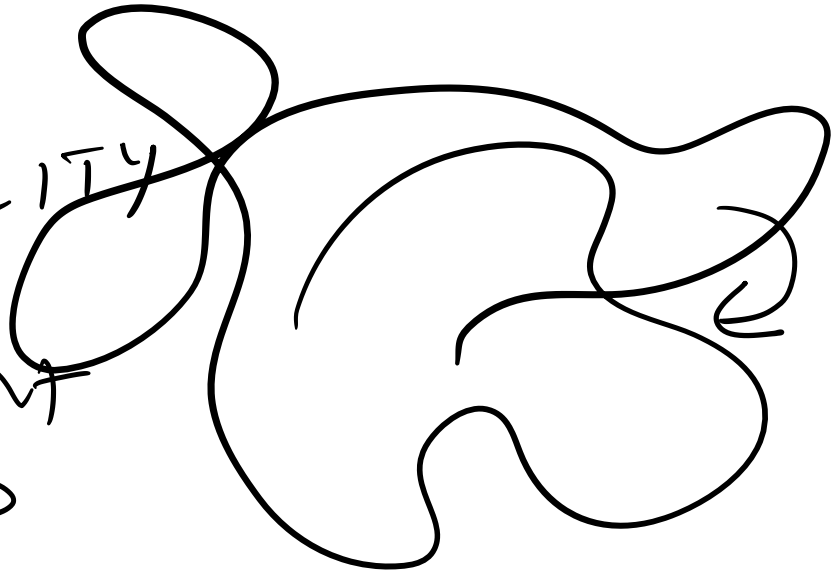
$T > T_g \Rightarrow$ RUBBER

SOFT, FLEXIBLE

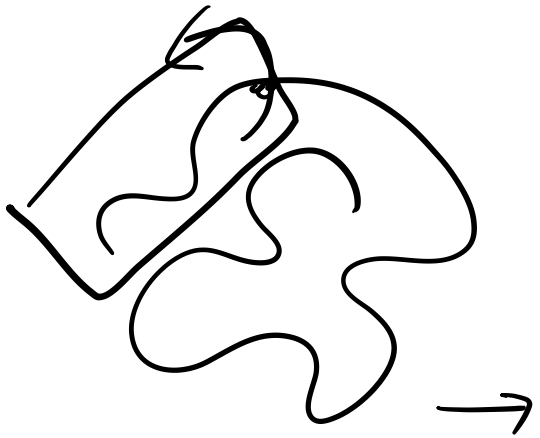

TRAN
LIQUID
Cp'
q
HEAT
SOLID
VAR
LATENT
HEAT
Cp: Im
TEMP→
100°).
CRYSTALLINE


C—C
T
100%
AMORPHOUS
KT
q
HEAT
VIBRATIONAL
ROTATIONAL
Cp'
ΔE
VIBRATIONAL
Cp
Tg
KT > ΔE
TEMP →

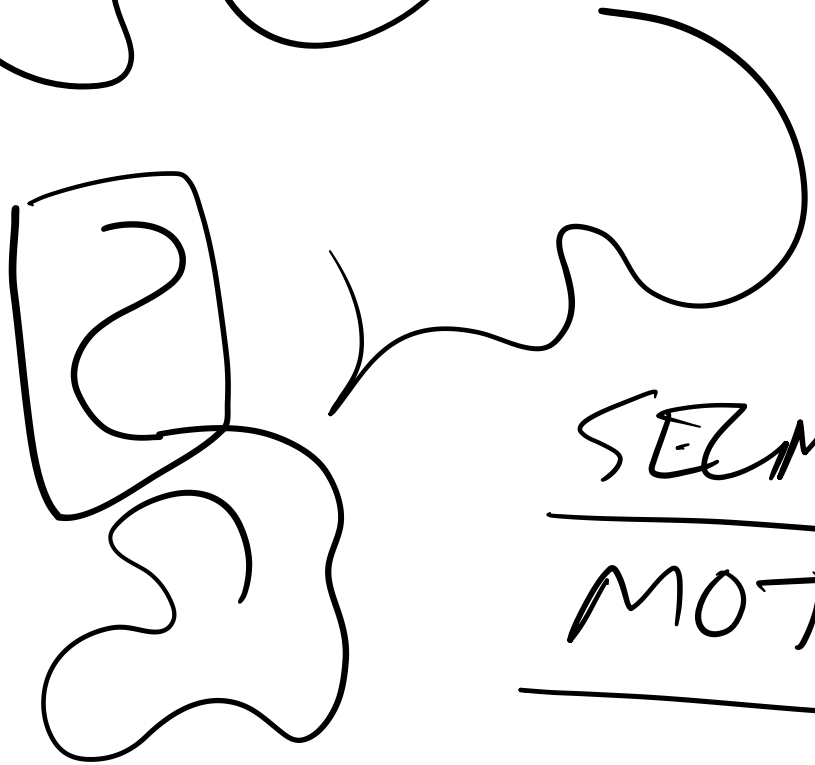
- MOL WT.
- CHAIN FLEXIBILITY
- PENDENT GROUP



T > Tg



T < Tg



SEGMENTAL MOTION