#2. Polymer collapse

We showed in class that

$F = U - TS$

where $S = k \ln W$

For the collapsed state, only 1 configuration -

$\ln W = \ln 1 = 0$

$F_{collapsed} = -\epsilon = 588 \times 10^{-23}\ J$ (same at all temps)

$F_{open} = -T k \ln W = -(310\ k)(1.38 \times 10^{-23} \frac{J}{K}) \ln 4$

$= -599 \times 10^{-23}$

~~Approx~~ slightly more open chains

#3 Heating water

at constant volume

a) $\Delta S = \int_{T_1}^{T_2} \frac{C_v}{T} dT = C_v \ln T_2/T_1$

$C_v = \left.\frac{\delta q}{dT}\right)_V$. From data

$C_v = \frac{39.5 - 19.7}{314 - 294} = 0.99\ cal/gm\ {}^\circ K$

$= \frac{39.5}{40} = 0.99\ cal/gm\ {}^\circ K$

$\Delta S = 0.99 \frac{cal}{gm\ K}(1 gm) \ln \frac{314}{274} =$

b) constant pressure

$\Delta S = \int_{T_1}^{T_2} \frac{C_p}{T} dT = C_p \ln T_2/T_1$

$C_p = \left.\frac{\delta q}{dT}\right)_P$ From data $C_p = \frac{40}{40} = 1 \frac{cal}{gm\ {}^\circ K}$

$\Delta S = 1 \frac{cal}{gm\ K}(1 gm) \ln \frac{314}{274} =$