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Course 565 / 665

Lecturer Prof. Cavagnero

Day 4. 19. 04

Date 9:55 am

Notes Taken By J. Hong

Total Number of Pages

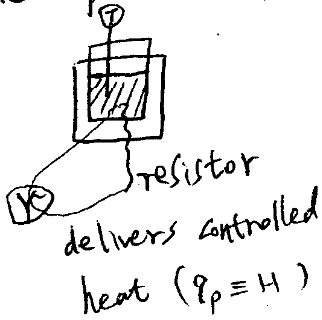
to get ΔS°_T: ① take 1st derivative of ΔG°, evaluate it at T.

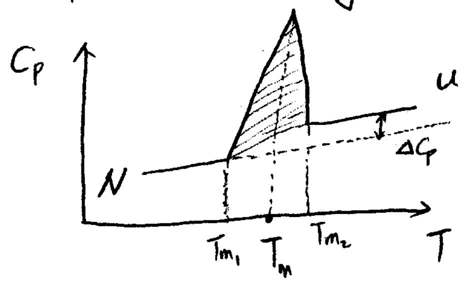
② $\int_{T_m}^{T} \frac{\Delta C_p}{T} \, dT = \int_{\Delta S^\circ_m}^{\Delta S^\circ_T} d\Delta S^\circ \Rightarrow \Delta C_p \ln\frac{T}{T_m} = \Delta S^\circ_T - \Delta S^\circ_m$

(note: $\Delta S^\circ_m = \Delta H^\circ_m / T_m$)

then $\Delta H^\circ_T = \Delta G^\circ + T\Delta S^\circ_T$

Get protein stability by differential scaning calorimetry (DSC)





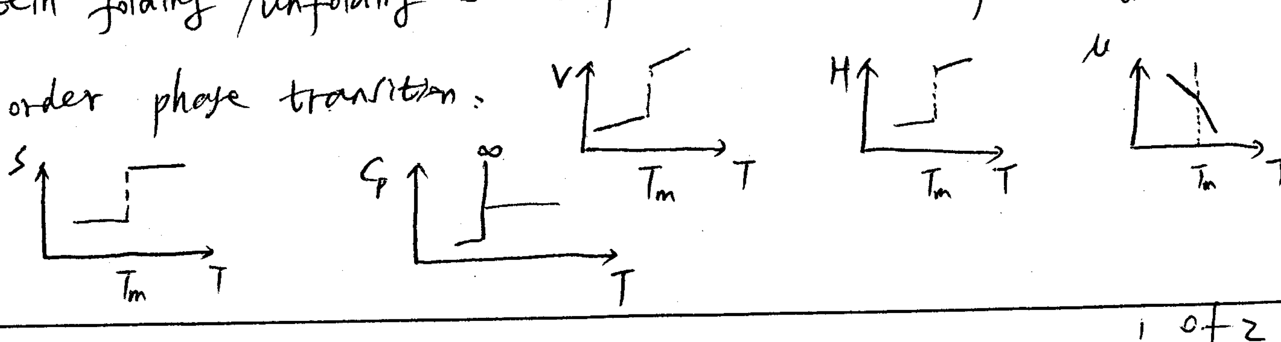
$$\Delta C_{p_{T_m}} = \left(\frac{\partial \Delta H^\circ_{T_m}}{\partial T}\right)_p \Rightarrow \Delta C_{p_{T_m}} (T_{m_2} - T_{m_1}) = \Delta H^\circ_{T_m}$$

across the whole transition.

This typical C_p - plot indicates: protein unfolding / folding is an "imperfect cooperative" transition.

* protein folding / unfolding is a pseudo-1st order phase transition

1st order phase transition:



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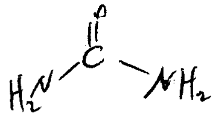
Work at constant P and T, follow unfolding as a function of [denaturant agent].

urea:



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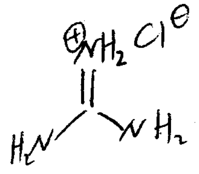

guanidine hydrochloride.

empiracally, people found: $\Delta G^\circ_D = \Delta G^\circ_{H_2O} - m[D]$

$m \equiv$ fraction of nonpolar surface that becomes exposed upon unfolding

2 of 2