MEASURING ENTROPY CHANGES

$$H \equiv U + PV$$

$$dH = dU + d(PV)$$

$dU = \delta Q + \delta W$ ← δW: WORK; δQ: HEAT

$$\delta W = -P dV$$

$$dH = \delta Q - P dV + P dV + V dP$$

$$dH = \delta Q + V dP$$

CONSTANT PRESSURE PROCESS:

$$\left(\frac{\partial H}{\partial T}\right)_P = \left(\frac{\partial Q}{\partial T}\right)_P \equiv C_P$$

$\partial Q = C_P \partial T$ ← HEAT REQUIRED TO RAISE TEMPERATURE BY SOME AMOUNT.

$$\int \delta Q = \int C_P dT$$

ASSUME C_P INDEPENDENT OF TEMPERATURE

$$Q = C_P \Delta T + C$$

THERE IS NO HEAT CHANGE FOR $\Delta T = \emptyset$

$$\emptyset = C_P(\emptyset) + C$$

$$\emptyset = C$$

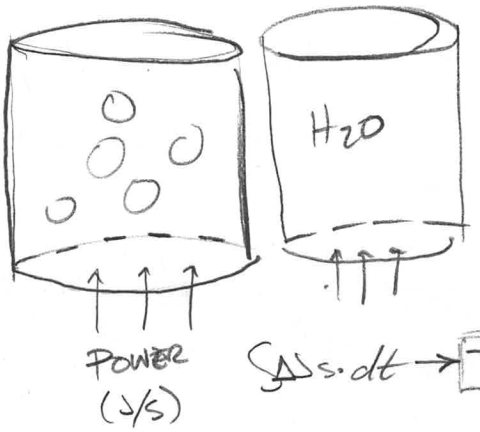
$$Q = C_P \Delta T$$

DEFINE MOLAR HEAT CAPACITY: (ALLOWS US TO, AMONG OTHER THINGS, COMPARE EXPERIMENTS).

$c_P = n C_P$ ← LOWERCASE

$$\boxed{Q = n C_P \Delta T} \leftarrow$$

DIFFERENTIAL SCANNING CALORIMETRY



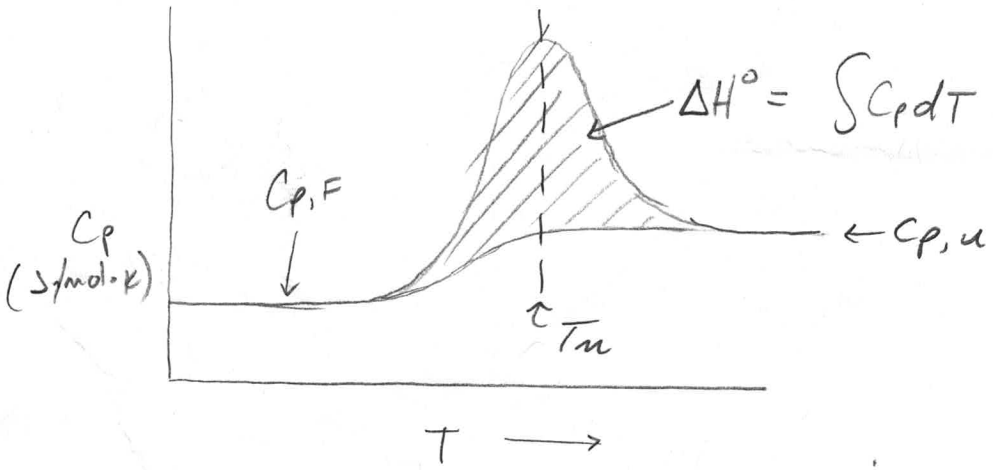
$$\frac{Q}{\Delta T} = n C_p$$

↑ MEASURE HEAT CAPACITY

IF TWO-STATE, REVERSIBLE:

FOLDED AND UNFOLDED

$$\Delta H = n \int C_p \, dT \qquad \left[\text{RECALL: } \left(\frac{\partial H}{\partial T}\right) \equiv C_p\right]$$



@ T_m: $\frac{[U]}{[F]} = 1 \quad \therefore \quad \Delta G^\circ = \emptyset$

$$\Delta G^\circ = \Delta H^\circ - T\Delta S^\circ$$

$$\emptyset = \Delta H^\circ - T_m \Delta S^\circ$$

$$T_m \Delta S^\circ = \Delta H^\circ$$

$$\Delta S^\circ = \Delta H^\circ / T_m \leftarrow \text{CAN ESTIMATE } \underline{\underline{\Delta S^\circ}} \text{ @ } T_m.$$

$$\Delta H^\circ(T) = \Delta H^\circ(T_M) + \Delta C_p (T - T_M)$$

$$\Delta S^\circ(T) = \Delta S^\circ(T_M) + \Delta C_p \ln(T/T_M)$$

CAN ESTIMATE ΔG, ΔH° AND ΔS° FOR ANY TEMP!