

agenda

- @H are w 7pm, 35-405
if you email me - 6:50 (8-419?)

- review: magnetic mtls
- review: TD properties
- problems on board.

MAA.	variable	name	units
\sqrt{B} = extensive	$\leftarrow \vec{B}$	induction (per volume)	$T = \text{kg/s} \cdot \text{C}$
intensive	$\leftarrow \vec{H}$	mag. field strength	A/m
	\vec{M}	magnetization (field density)	A/m
	μ_0	vacuum permeability	$\text{H/m} = \frac{\text{kg} \cdot \text{m}}{\text{C}^2}$
	χ	susceptibility (mtl)	—
	μ	permeability (mtl)	—

relations: $\vec{B} = \mu_0 (1 + \chi) \vec{H}$ | $dW = \vec{H} \cdot d\vec{B}$ but! $B = B(H)$
 $\vec{M} = \chi \vec{H}$ | $\int dW = \int \mu H dH$

TD PROF

$$C_x = \left(\frac{dq_{rev}}{dT} \right)_x = \left(\frac{T ds}{dT} \right)_x = T \left(\frac{\partial s}{\partial T} \right)_x \quad x = P, V, H, \dots$$

$$dH = T ds + V dP \xrightarrow{(if)} C_P = \left(\frac{\partial H}{\partial T} \right)_P ; dq_{P} = H$$

$$dU = T ds - P dV \xrightarrow{(if)} C_V = \left(\frac{\partial U}{\partial T} \right)_P ; dq_{V} = U$$

- adiabatic: $q = 0$. $\Delta U = w$
no Δq , ΔW ; just q_o , w . (no q_f , q_i ...)
only transfer

$$\left. \begin{aligned} \alpha_P &= \frac{1}{V} \left(\frac{\partial V}{\partial T} \right)_P \\ \kappa_T &= -\frac{1}{V} \left(\frac{\partial V}{\partial P} \right)_T \end{aligned} \right\} \begin{array}{l} \text{- atomic basis} \\ \text{- experimentally} \\ \text{determined} \end{array}$$

$$\Delta H_{tr}: \text{watch sign! } \Delta H_{tr} = -\Delta H_{sur}$$

• heat flow in isolated system: $\boxed{\Delta U}$

$$\oint \delta I = -q_{tr}$$