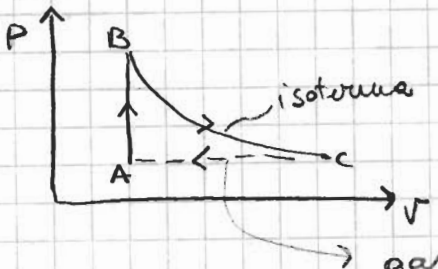
Esercizio su ciclo 2



n
T_B
Q_{BC}

→ gas a contatto con una sorgente esterna a temperatura T_S incognita
$T_S = T_A$

1) ΔS_{Bc} ? $\qquad \Delta S_{Bc} = \frac{Q_{Bc}}{T_B}$

2) T_A ?

$$\Delta S_{tot} = 0 = \Delta S_{AB} + \Delta S_{Bc} + \Delta S_{CA}$$

$$= n C_V \ln \frac{T_B}{T_A} + \frac{Q_{Bc}}{T_B} + n C_p \ln \frac{T_A}{T_B} = 0$$

$$n\underbrace{(C_p - C_V)}_{R} \ln \frac{T_A}{T_B} = -\frac{Q_{Bc}}{T_B}$$

$$\ln \frac{T_A}{T_B} = -\frac{Q_{Bc}}{nRT_B} \Rightarrow T_A = T_B\, e^{-\frac{Q_{Bc}}{nRT_B}}$$

3) $\mathcal{L}_{CA+AB}$?

$$\mathcal{L}_{eA+AB} = -\Delta U_{eB} + Q_{CA+AB} = n C_p (T_A - T_B) + n C_V (T_B - T_A)$$

$$= nR(T_A - T_B)$$

4) $\Delta S_{s+g} = \Delta S_{s+g,AB} + \Delta S_{s+g\,Bc} + \Delta S_{s+g\,CA}$

AB e Bc sono reversibili $\Rightarrow \Delta S_{s+g} = 0$

$$= \Delta S_{s\,CA} + \Delta S_{g\,CA} = n C_p \left(\frac{T_B}{T_A} - T_A\right) + n C_p \ln \frac{T_A}{T_B}$$