miscela gas combustibile $+ O_2$, T_0

in un recipiente rigido pareti adiab.

Dopo combustione $T_1 > T_0$

$Q, W, \Delta U = ?$

$Q = 0$ $W = 0$ $\Rightarrow$ $Q = \Delta U + W$

                               $\Rightarrow$ $\Delta U = Q - W = 0$

gas espansione, $p = 2 \cdot 1.013 \cdot 10^5 \, Pa = cost$

$\hookrightarrow$ (isobara)

$V_f = 2 V_i$

$Q_{ASS} = 5 \cdot 4.186 \cdot 10^3 \, J$

$\Delta U = 4.186 \cdot 10^3 \, J$

$\boxed{V_i = ?}$
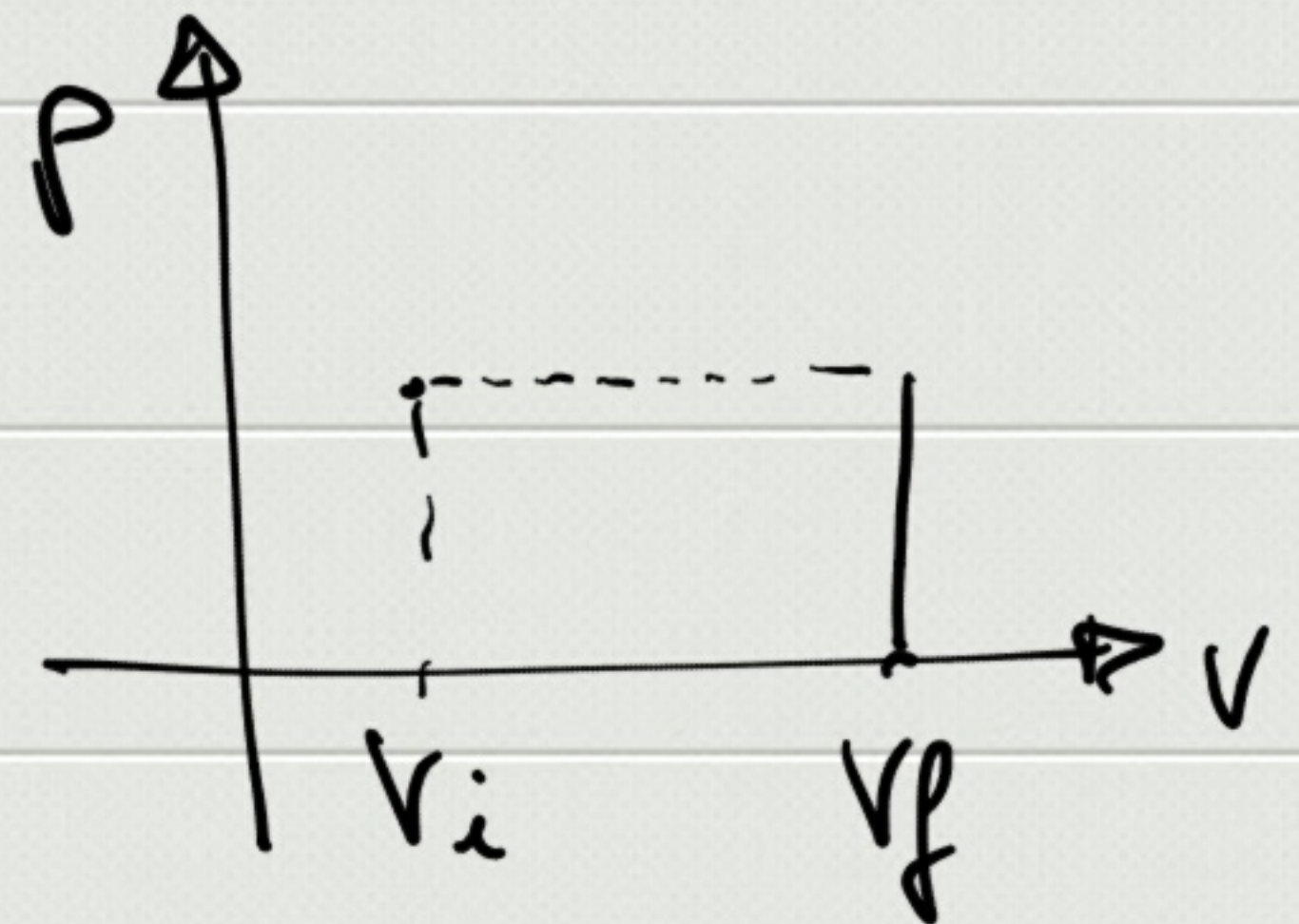
$Q = \Delta U + W \implies W = Q_{ASS} - \Delta U$

$$\overset{!}{=} \int_{V_i}^{V_f} p(V,T) \, dV = p \int_{V_i}^{V_f} dV =$$

$$= p(V_f - V_i) = p V_i$$

$$V_i = \frac{Q_{ASS} - \Delta U}{p} = 0.0826 \, m^3$$

Patm

$T_0 = 373.15 \; K$

$p = P_{atm} = cost$
$\;\;\; \hookrightarrow 1.013 \cdot 10^5 \; Pa$

H_2O

T_0

$\Delta U \; (evap. \; 1g \; H_2O)$

$Vol \; (1g \; vapor \; H_2O \; T_0, P_{atm}) = 1.67 \cdot 10^{-3} \; m^3$

$Q = \Delta U + W \quad \Rightarrow \quad \Delta U = Q - W$

$\Uparrow$

$* \Rightarrow \Delta U = 2090 \; J$

$Q = m \lambda_{ev}$

$\lambda_{ev, H_2O} = 2.26 \cdot 10^6 \; J/kg$

$\downarrow$
$10^{-3} \; kg \qquad \Rightarrow \quad Q = 2.26 \cdot 10^3 \; J \quad *$

$W = \int p \, dV = p \int_{V_i}^{V_f} dV = p \, (V_f - V_i) =$

$= 1.013 \cdot 10^5 \left(1.67 \cdot 10^{-3} - 10^{-6} \right) = 169 \; J \quad *$