

Clase 90 27 Enero 2021

Título de la nota

27/01/2021

Proceso Isobárico

1 bar vapor

Proceso isobárico en va
Insertar en las celdas de color amaril

m [kg]	10	Valores de tabla				
p [bar]	1	T [°C]	H [kJ/kg]	V [m ³ /kg]	v [L/kg]	s [kJ/kgK]
[atm]	0.9869	110	2696.8	1.746	1746	7.4152
T _{inicial} [K]	383.15	120	2717.4	1.794	1794	7.4683
T _{final} [K]	393.15					

válido de 100 a 800 °C
intervalos de 10°C

ΔH [kJ]	206.0000
W [kJ]	48.0000
ΔU [kJ]	158.0000
ΔS [kJ/K]	0.5310



$$\Delta H = (\hat{H}_2 - \hat{H}_1) m_{total} = \text{kJ}$$

\hat{H}_2 at 120°C \hat{H}_1 at 110°C

$$W = P(V_2 - V_1)$$

$$W = 1 \text{ bar} (1.794 - 1.746) \text{ m}^3 / \text{kg}$$

$$= \left(0.048 \frac{\text{bar m}^3}{\text{kg}} \right) \cancel{\text{kg}} = 0.48 \text{ bar m}^3$$

$$= \left(0.48 \cancel{\text{bar m}^3} \right) \left(\frac{1 \cancel{\text{atm}}}{1.01325 \cancel{\text{bar}}} \right) \left(\frac{1.01325 \times 10^5 \cancel{\text{N/m}^2}}{\cancel{\text{atm}}} \right)$$

$$= 4800 \text{ J} = 48 \text{ kJ}$$

$$\frac{1 \text{ bar} \times 1 \text{ atm}}{1.01325 \text{ bar}} = 0.9869$$

$$\begin{aligned}\Delta U &= q - w \\ &= \Delta H - w \\ &= 158 \text{ kJ}\end{aligned}$$

Proceso isobárico en vapor

Insertar en las celdas de color amarillo

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[atm]	0.9869	120	2717.4	1.794	1794	7.4683
T _{inicial} [K]	393.15	110	2696.8	1.746	1746	7.4152
T _{final} [K]	383.15					

válido de 100 a 800 °C
intervalos de 10°C

ΔH [kJ]	-206.0000
W [kJ]	-48.0000
ΔU [kJ]	-158.0000
ΔS [kJ/K]	-0.5310



$$\Delta H = \Delta U + \Delta \cancel{PV}^0$$

sólido

$$\Delta H = \Delta U$$

Proceso de sublimación y/o deposición parcial o total

Insertar en las celdas de color amarillo los valores correspondientes

m [kg]	1.00
T [K]	273.15
p [mmHg]	4.58
Y _{inicial}	0.00
Y _{final}	1.00

Valores de tabla				
	V [m ³ /kg]	H [kJ/kg]	S [kJ/kgK]	U [kJ/kg]
Vapor	205.9	2496.9	9.139	2373.1
Sólido	1.0885	-332.7	-1.218	-332.7



Resultados			
H ₁ [kJ]	-332.7	ΔH [kJ]	2829.60
H ₂ [kJ]	2496.9	ΔS [kJ/K]	10.36
U ₁ [kJ]	-332.7	ΔU [kJ]	2705.80
U ₂ [kJ]	2373.1	ΔG [kJ]	0.5855
S ₁ [kJ/K]	-1.218		
S ₂ [kJ/K]	9.139		

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Sublimación Tabla

Proceso de sublimación y/o deposición parcial o total

Insertar en las celdas de color amarillo los valores correspondientes

m [kg]	1.00
T [K]	273.15
p [mmHg]	4.58
Y _{inicial}	0.00
Y _{final}	0.50

Valores de tabla				
	V [m ³ /kg]	H [kJ/kg]	S [kJ/kgK]	U [kJ/kg]
Vapor	205.9	2496.9	9.139	2373.1
Sólido	1.0885	-332.7	-1.218	-332.7



Resultados			
H ₁ [kJ]	-332.7	ΔH [kJ]	1414.80
H ₂ [kJ]	1082.1	ΔS [kJ/K]	5.18
U ₁ [kJ]	-332.7	ΔU [kJ]	1352.90
U ₂ [kJ]	1020.2	ΔG [kJ]	0.2927
S ₁ [kJ/K]	-1.218		
S ₂ [kJ/K]	3.9605		

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$$\Delta \hat{u} = (\hat{H}_2 - \hat{H}_1) m_{total}.$$

$$\hat{H}_1 = y_1 \hat{H}_v + (1-y_1) \hat{H}_s$$

$$y_1 = 0$$

$$\hat{H}_2 = y_2 \hat{H}_v + (1-y_2) \hat{H}_s$$

$$y_2 = 1$$

