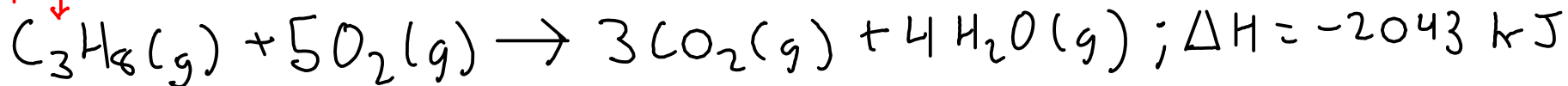


propane
↓



Calculate the volume of propane gas at 25.0 C and 1.08 atm required to provide 565 kJ of heat using the reaction above.

- 1 - Convert the energy to moles propane using the thermochemical equation.
- 2 - Convert moles propane to volume using the ideal gas law.

$$-2043 \text{ kJ} = \text{mol C}_3\text{H}_8$$

$$-565 \text{ kJ} \times \frac{\text{mol C}_3\text{H}_8}{-2043 \text{ kJ}} = 0.27655 \text{ mol C}_3\text{H}_8 \quad \textcircled{1}$$

$$\frac{V = nRT}{P} \quad \left| \quad \begin{array}{l} n = 0.27655 \text{ mol C}_3\text{H}_8 \quad R = 0.08206 \frac{\text{L} \cdot \text{atm}}{\text{mol} \cdot \text{K}} \\ T = 25.0^\circ\text{C} = 298.2 \text{ K} \quad P = 1.08 \text{ atm} \\ V = ??? \end{array} \right.$$

$$V = \frac{(0.27655 \text{ mol C}_3\text{H}_8)(0.08206 \frac{\text{L} \cdot \text{atm}}{\text{mol} \cdot \text{K}})(298.2 \text{ K})}{(1.08 \text{ atm})}$$

$$= \boxed{6.27 \text{ L propane required}}$$