

Answer on Question #49263, Chemistry, Other

Task:

A 0.296 g sample of carbon dioxide, CO₂, has a volume of 525 mL and a pressure of 425 mmHg. What is the temperature, in kelvins and degrees Celsius, of the gas?

Answer:

$$pV = \frac{m}{M}RT$$

$$T = \frac{pV}{\frac{m}{M}R}$$

$$M(\text{CO}_2) = 44 \text{ g/mol}$$

$$R = 62,364 \text{ mmHg} \cdot \text{l/mol} \cdot \text{K}$$

$$T = \frac{425 \cdot 0,525}{\frac{0,296}{44} \cdot 62,364} = 531 \text{ K}$$

$$^{\circ}\text{C} = 531 - 273 = 258^{\circ}\text{C}$$