

Answer to the Question 64914

Calculate the Molecular weight/mass of the pure Gaseous compound having a density of 6.2 g/L at -40°C and 1000mmHg?

$$PV = \frac{m}{M} \cdot R \cdot T$$

$$P = \frac{m}{M \cdot V} \cdot R \cdot T$$

$$\rho = \frac{m}{V}$$

$$P = \frac{\rho}{M} \cdot R \cdot T$$

$$M = \frac{\rho}{P} \cdot R \cdot T$$

$$\rho = 6.2 \text{ g/L} = 6.2 \text{ kg/m}^3$$

$$P = 1000 \text{ mm Hg} = 133333.33 \text{ Pa}$$

$$T = 273 - 40 = 233 \text{ K}$$

$$R = 8.31 \text{ J/mol} \cdot \text{K}$$

$$M = \frac{6.2}{133333.33} \cdot 8.31 \cdot 233 = 0.09 \text{ kg/mol}$$

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