

Question 8

8. Automobile air bags are inflated by nitrogen gas generated by the rapid decomposition of sodium azide. If an air bag has a volume of 36 L and is to be filled with nitrogen gas at 1.15 atm and 26.0°C, how many grams of NaN_3 must be decomposed?

Answer:

Using $PV=nRT$

$$n=PV/RT$$

$$n=(1.15 \times 36) / (0.082 \times 299)$$

$$n=1.69 \text{ moles}$$

$$\text{Mole} = \text{mass} / \text{molar mass}$$

$$\text{Mass} = \text{mole} \times \text{molar mass}$$

$$\text{Mass} = 1.69 \times 65 = 109.85 \text{ g}$$