

## Answer on the question #55802 - Chemistry - General chemistry

### Question:

Calculate the volume of 17.0g of carbon monoxide at STP.

### Solution:

According to what is established by IUPAC, STP conditions are 273.15 K and 100,000 Pa. Assuming ideal gas behavior, the volume of the gas is:

$$V = \frac{nRT}{p},$$

where  $n$  is the number of the moles,  $R$  is the ideal gas constant,  $T$  is the temperature and  $p$  is the pressure. The number of the moles of carbon monoxide is:

$$n(\text{CO}) = \frac{m(\text{CO})}{M(\text{CO})} = \frac{17.0 \text{ g}}{28.01 \text{ g mol}^{-1}} = 0.61 \text{ mol}.$$

Then, the volume is:

$$V = \frac{0.61 \text{ mol} \cdot 8.314 \text{ J mol}^{-1} \text{ K}^{-1} \cdot 273.15 \text{ K}}{100,000 \text{ Pa}} = 1.38 \cdot 10^{-2} \text{ m}^3, \text{ or } 13.8 \text{ L}$$

**Answer:**  $1.38 \cdot 10^{-2} \text{ m}^3$ , or 13.8 L