

Question #81650, Chemistry / General Chemistry | for completion

For the following reaction, 15.2 grams of carbon monoxide are allowed to react with 6.37 grams of oxygen gas .

carbon monoxide(g) + oxygen(g) carbon dioxide(g)

What is the maximum mass of carbon dioxide that can be formed?

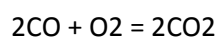
grams

What is the FORMULA for the limiting reagent?

What mass of the excess reagent remains after the reaction is complete?

grams

Solution:



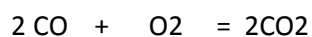
From the reaction equation: mole ratio CO: O₂= 2: 1

$$n(\text{CO}) = m/M = 15.2/28 = 0.54 \text{ moles}$$

$$n(\text{O}_2) = 6.32/32 = 0.2 \text{ mole}$$

CO is in excess. Limiting reagent is O₂. We need to use n(O₂) for calculation

$$y \text{ moles} \quad 0.2 \text{ moles} \quad x \text{ g}$$



$$2 \text{ moles} \quad 1 \text{ mole} \quad 2 \cdot 44 \text{ g/mole}$$

$$m(\text{CO}_2) = 17,2 \text{ g.}$$

During full reaction disappeared y moles of CO.

$$y = 2 \cdot 0.2 / 1 = 0.4 \text{ moles of CO}$$

After reaction remains 0.54-0.4= 0.14 moles CO

$$m(\text{CO}) = n \cdot M = 0.14 \cdot 28 = 3.92 \text{ g}$$

Answer: m(CO₂)= 17,2 g. Limiting reagent is O₂. Remains 3.92g CO

