

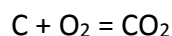
## Answer on Question #41842 – Chemistry – Inorganic Chemistry

### Question:

How many particles of CO<sub>2</sub> can be produced from 20.0 grams of O<sub>2</sub>?

### Answer:

Reaction:



First of all, we will find number of moles of O<sub>2</sub> which have been used in chemical reaction.

$$v = \frac{m}{M}$$

where  $v$  – is number of moles of O<sub>2</sub>,  $m$  – is mass of O<sub>2</sub>,  $M$  – is molecular mass of O<sub>2</sub>.

$$M(O_2) = 15.9949 + 15.9949 = 31.9898 \approx 32 \text{ g/mole}$$

$$v = \frac{20 \text{ g}}{32 \text{ g/mole}} = 0.625 \text{ mole}$$

As you see from the chemical reaction of carbon oxidation from 1 mole of O<sub>2</sub> we can get 1 mole of CO<sub>2</sub>. And in 1 mole of substance we have  $6.022 \times 10^{23}$  elementary entities or particles of the substance.

But in our case we have just 0.625 mole of O<sub>2</sub> which can produce 0.625 mole of CO<sub>2</sub>.

In **1 mole** of substance is  **$6.022 \times 10^{23}$**  elementary particles

In **0.625 mole** of substance is  **$X$**  elementary particles

Then

$$X = \frac{0.625 \text{ mole} \times 6.022 \times 10^{23} \text{ elementary particles}}{1 \text{ mole}} \\ = 3.764 \times 10^{23} \text{ elementary particles}$$

### Answer:

**$3.764 \times 10^{23}$  elementary particles of CO<sub>2</sub>** can be produced from 20.0 grams of O<sub>2</sub>.