Answer on Question #62007 - Chemistry – General Chemistry

Question:

How many oxygen atoms are in 3.50 g of quartz?

Answer:

Chemical formula of quartz – SiO_2, so its molar mass is:

$$M(SiO_2) = 60.08g$$

and chemical quantity equals:

$$n(SiO_2) = \frac{m(SiO_2)}{M(SiO_2)} = \frac{3.50g}{60.08\ g/mol} = 5.83 \cdot 10^{-2}mol$$

Number of particles:

$$N(SiO_2) = n(SiO_2) \cdot N_a = 5.83 \cdot 10^{-2}mol \times 6.02 \cdot 10^{23}mol^{-1} = 3.51 \cdot 10^{22}$$

Each SiO_2 "particle" contains 2 oxygen atoms, thus:

$$N(O) = N(SiO_2) \times 2 = 7.02 \cdot 10^{22}$$