Warm Up

Calculate the molar masses for:

a) $C_6H_{12}O_6$

$(6 \times 12.01) + (12 \times 1.01) + (6 \times 16.00)$

$= 180.18$ g/mol

b) $Mg_3(PO_4)_2$

$(3 \times 24.31) + (2 \times 30.97) + (8 \times 16.00)$

$= 262.87$ g/mol

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$$1.75\ \text{mol } CHCl_3 \times \frac{6.02\times10^{23}\ \text{molecules } CHCl_3}{1\ \text{mol } CHCl_3} \times \frac{5\ \text{atoms}}{1\ \text{molecules } CHCl_3}$$

$$= \boxed{5.27\times10^{24}\ \text{atoms}}$$

Once molar mass is established, a conversion can be made from grams to moles or moles to grams (depending on the measurement of the sample)

$$Mm = \frac{m}{n}$$

m ← **mass (g)**

n ← **# of moles**

$$58.44\,g/mol = \frac{100.\,g}{n}$$

$$(58.44\,g/mol)n = 100.\,g$$

$$n = \frac{100.\,g}{58.44\,g/mol}$$

Ex. How many moles are found in 100.g of NaCl?

$$100.\,g\ NaCl \times \frac{1\ mol\ NaCl}{58.44\ g\ NaCl} = \boxed{1.71\ mol\ NaCl}$$

$$NaCl \rightarrow (1 \times 22.99) + (1 \times 35.45) = 58.44\,g/mol$$

Ex. What is the mass of 5.00 mol of NaCl?

$$5.00\ mol\ NaCl \times \frac{58.44\ g\ NaCl}{1\ mol\ NaCl} = \boxed{292\,g\ NaCl}$$

$$Mm = \frac{m}{n}$$

$$58.44\,g/mol = \frac{m}{5.00\,mol}$$

Homework

Worksheet - Molar Calculations

1. 8.97×10^{-3} mol
   0.00897
2. 1.49×10^{25} atoms
3. 1.30×10^{26} atoms
4. 46.01 g/mol
5. 14 300 mol
6. 342.34 g/mol
7. 159.70 g/mol
8. 4.24×10^{24} molecules
9. 1.79×10^{25} atoms
10. 643 g
11. 0.266 mol
12. 10 900 g
13. 6.26 mol