

Mole Relationships

Mass (g) & the Mole (mol)

The mass of 1 mole of a substance is equal to its molar mass.

$$1 \text{ mol} = \text{molar mass (g)}$$

Ex) What is the ^{? g} mass of 0.600 mol of carbon dioxide? GIVEN

$$\frac{0.600 \text{ mol CO}_2 \times 44.01 \text{ g}}{1 \text{ mol}} = 26.406 \text{ g CO}_2$$

$\Rightarrow 26.4 \text{ g CO}_2$

MM - CO₂

$$\text{C: } 1 \times 12.01 \text{ g} = 12.01 \text{ g}$$

$$\text{O: } 2 \times 16.00 \text{ g} = 32.00 \text{ g}$$

$$\boxed{44.01 \text{ g} = 1 \text{ mol}}$$

conversion factor

have ∞ sig. figures

Ex) How many [?] moles are in 550 g of sodium hydroxide? GIVEN

$$\frac{550 \text{ g NaOH}}{40.00 \text{ g}} \times \frac{1 \text{ mol}}{1} = 13.75 \text{ mol NaOH}$$

$\Rightarrow 14 \text{ mol NaOH}$

NaOH

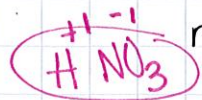
$$\text{Na: } 22.99 \text{ g}$$

$$\text{O: } 16.00 \text{ g}$$

$$\text{H: } + 1.01 \text{ g}$$

$$\boxed{40.00 \text{ g} = 1 \text{ mol}}$$

Ex) what is the mass of 3.33 moles of nitric acid?



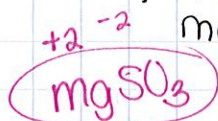
$$\frac{3.33 \text{ mol HNO}_3}{1} \times \frac{63.02 \text{ g}}{\text{mol}} = 209.8566 \text{ g HNO}_3$$

1 mol = 63.02g

~~Method~~

210. g HNO₃

Ex) How many moles are in 42.60g of magnesium sulfite?



$$\frac{42.60 \text{ g MgSO}_3}{104.38 \text{ g}} \times \frac{1 \text{ mol}}{1} = .408124162 \text{ mol MgSO}_3$$

1 mol = 104.38g

.4081 mol MgSO₃