

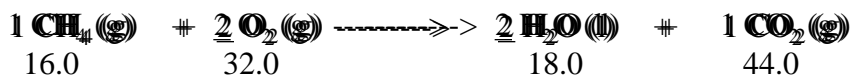
Stoichiometry (mole to mole conversions) Supplemental Packet p 129-130

There are seven skills which the student must master before performing stoichiometric calculations.

1. Using the periodic table, a student should be able to name and write chemical formulas correctly
2. Write a balanced chemical equation
3. Calculate molar mass to at least one digit past the decimal place.
4. To convert mass to moles
5. To convert moles to mass.
6. To convert between moles of reactants and moles of products using mole ratios from the balanced chemical equation.
7. Determine the limiting reagent.

3. Calculate molar mass and place each molar mass underneath

1. Write out the balanced reaction into a reaction of reactants and products.

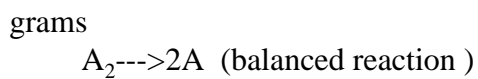


Methane gas is burned in excess oxygen to produce carbon dioxide & water
 If 25.0 grams of methane is burned how many grams of water is produced?

1. balance the reaction
2. calculate molar mass

grams	25.0	excess	?	?
	1 CH ₄ (g)	+ 2 O ₂ (g)	----->	2 H ₂ O (l) + 1 CO ₂ (g)
MM (g/mole)	16.0	32.0		18.0 44.0
moles	1.56	excess	?	?

3. make a table



MM
 moles

4. complete the table

4. From the original equation, place the given masses of starting materials or products above the corresponding reagent and a question mark for the information you are seeking.

The term excess means you have enough reagent for complete reaction.

Complete the table by first calculating moles H₂O and moles CO₂

grams	25.0	excess	?	?
	1 CH ₄ (g)	+ 2 O ₂ (g)	----->	2 H ₂ O (l) + 1 CO ₂ (g)
MM (g/mole)	16.0	32.0		18.0 44.0
moles	1.56	excess	moles H ₂ O?	moles CO ₂ ?

$$\text{moles } 1.56 \text{ moles CH}_4 \times \frac{2 \text{ moles H}_2\text{O}}{1 \text{ mole CH}_4} = 3.125 \text{ moles H}_2\text{O}$$

$$\text{moles } 1.56 \text{ moles CH}_4 \times \frac{1 \text{ moles CO}_2}{1 \text{ mole CH}_4} = 1.56 \text{ moles CO}_2$$

4. From the original equation, place the given masses of starting materials or products above the corresponding reagent and a question mark for the information you are seeking.

The term excess means you have enough reagent for complete reaction.

Using the moles H ₂ O and moles CO ₂ , calculate grams of H ₂ O and CO ₂					
grams	25.0	excess		?	?
	1 CH ₄ (g)	+ 2 O ₂ (g)	----->	2 H ₂ O (l)	+ 1 CO ₂ (g)
MM (g/mole)	16.0	32.0		18.0	44.0
moles	1.56	excess		3.125	1.56
moles	1.56 moles CH ₄	x	$\frac{2 \text{ moles H}_2\text{O}}{1 \text{ mole CH}_4}$	=	3.125 moles H ₂ O
moles	1.56 moles CH ₄	x	$\frac{1 \text{ moles CO}_2}{1 \text{ mole CH}_4}$	=	1.56 moles CO ₂

4. From the original equation, place the given masses of starting materials or products above the corresponding reagent and a question mark for the information you are seeking.

The term excess means you have enough reagent for complete reaction.

grams	25.0	excess		grams H ₂ O	grams CO ₂
	1 CH ₄ (g)	+ 2 O ₂ (g)	----->	2 H ₂ O (l)	+ 1 CO ₂ (g)
MM (g/mole)	16.0	32.0		18.0	44.0
moles	1.56	excess		3.125	1.56
moles	3.125 moles H ₂ O	x	$\frac{18.0 \text{ grams H}_2\text{O}}{1 \text{ mole H}_2\text{O}}$	=	52.6 grams H ₂ O
moles	1.56 moles CO ₂	x	$\frac{44.0 \text{ grams CO}_2}{1 \text{ mole CO}_2}$	=	68.6 grams CO ₂

4. From the original equation, place the given masses of starting materials or products above the corresponding reagent and a question mark for the information you are seeking.

The term excess means you have enough reagent for complete reaction.

And Your Done!!!!

grams	25.0	excess	56.2	68.6
	1 CH ₄ (g)	+ 2 O ₂ (g)	----->	2 H ₂ O (l) + 1 CO ₂ (g)
MM (g/mole)	16.0	32.0		18.0 44.0
moles	1.56	excess	3.125	1.56

$$\text{moles} \quad 3.125 \text{ moles H}_2\text{O} \times \frac{18.0 \text{ grams H}_2\text{O}}{1 \text{ mole H}_2\text{O}} = 56.2 \text{ grams H}_2\text{O}$$

$$\text{moles} \quad 1.56 \text{ moles CO}_2 \times \frac{44.0 \text{ grams CO}_2}{1 \text{ mole CO}_2} = 68.6 \text{ grams CO}_2$$