

WJEC (Eduqas) Chemistry GCSE

3 - Chemical Formulae, Equations and Amount of Substance

Flashcards

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Explain why atoms form ions



Explain why atoms form ions

Atoms form ions in order to gain a full outer shell of 8 electrons, as this is the most stable arrangement



What ions do group 3 atoms create?



What ions do group 3 atoms create?

3+ ions



What ions do group 6 atoms create?



What ions do group 6 atoms create?

-2 ions



How do metal atoms form ions?



How do metal atoms form ions?

Losing electrons to form positive ions



What is the electronic structure of
 ${}_{12}\text{Mg}^{2+}$?



What is the electronic structure of ${}_{12}\text{Mg}^{2+}$?

2,8

A magnesium atom has the electronic structure of 2,8,2 and it has lost 2 electrons in order to form this particular ion. Therefore there are no electrons in the outer shell.



What is the electronic structure of $_{17}\text{Cl}^-$?



What is the electronic structure of ${}_{17}\text{Cl}^-$?

2,8,8

A chloride atom has the electronic structure of 2,8,7 and it has gained 1 electron in order to form this particular ion.



What properties does an ionic compound have?



What properties does an ionic compound have?

Ionic compounds have high melting and boiling points and when liquid they are able to conduct electricity.



What is the term for the process of an atom gaining an electron to form a negative ion?



What is the term for the process of an atom gaining an electron to form a negative ion?

Reduction - the gaining of electrons



What is the term for the process of an atom losing an electron to form a positive ion?



What is the term for the process of an atom losing an electron to form a positive ion?

Oxidation - the loss of electrons



What is the formula of an ionic compound formed from calcium and oxygen?



What is the formula of an ionic compound formed from calcium and oxygen?

CaO - calcium is in group 2 and so calcium ion will be 2+ and oxygen is group 6 so will have a charge of 2-



What is the empirical formula of a compound?



What is the empirical formula of a compound?

The simplest whole number ratio of atoms of different elements within a compound



Explain how to calculate the empirical formula of a compound from reacting mass data



Explain how to calculate the empirical formula of a compound from reacting mass data

For each element, calculate $\text{mass} \div \text{relative mass}$

Form a ratio from these values

Use the ratios to write the formula for the compound



Calculate the empirical formula when 4g
of hydrogen ($A_r = 1$) reacts with 32g
oxygen ($A_r = 16$)



Calculate the empirical formula when 4g of hydrogen ($A_r = 1$) reacts with 32g oxygen ($A_r = 16$)

	H	O
Mass	4	32
A_r	1	16
<u>Mass</u>	4	2
A_r		
Ratio	2:1 so H_2O	



Explain the law of conservation of mass



Explain the law of conservation of mass

No atoms are lost or made during a chemical reaction therefore the mass of the products is equal to the mass of the reactants



What is the half equation for Mg^{2+} ?



What is the half equation for Mg^{2+} ?



What is the half equation for 2Cl^- ?



What is the half equation for 2Cl^- ?



What is Avogadro's number?



What is Avogadro's number?

Avogadro's number is the number of atoms within one mole of an element.

One mole of atoms contains 6×10^{23} atoms, for any element.



How do you calculate the number of moles?



How do you calculate the number of moles?

Number of moles = $\frac{\text{mass}}{\text{formula mass}}$



How many moles of sodium (A_r 23) is in
22.5g?



How many moles of sodium (A_r 23) is in 22.5g?

$$\text{Number of moles} = \frac{22.5}{23} = 1$$



What is the relative formula mass of 5 mol carbon dioxide with a mass of 220g?



What is the relative formula mass of 5 mol carbon dioxide with a mass of 220g?

Number of moles = $\frac{\text{mass}}{\text{formula mass}}$

Formula mass = $\frac{\text{mass}}{\text{number of moles}}$

Formula mass = $\frac{220}{5} = 44$



How many moles of calcium (A_r 20) is in 201g?



How many moles of calcium (A_r 20) is in 201g?

$$\text{Number of moles} = \frac{201}{20} = 10$$



What is the relative formula mass of
 H_2O ? ($A_r \text{ O} = 16$)



What is the relative formula mass of H_2O ? ($A_r \text{ O} = 16$)

$A_r \text{ H} = 1, \text{ O} = 16$

$(1 \times 2) + 16 = 18$



Calculate the mass of 2 mol of CO_2



Calculate the mass of 2 mol of CO₂

Number of moles = $\frac{\text{mass}}{\text{formula mass}}$

Mass = number of moles x formula mass

Mass = 2 x (12 + 16 + 16) = 2 x 44 = 88g



What is the meaning of a limiting reactant?



What is the meaning of a limiting reactant?

A reactant which is completely used up within the chemical reaction and therefore limits how much product is formed



Calculate the number of molecules in 0.5
mol of CO_2



Calculate the number of molecules in 0.5 mol of CO₂

$$0.5 \times 6 \times 10^{23} = 3.01 \times 10^{23}$$



What is the definition of a molar volume?



What is the definition of a molar volume?

The volume occupied by one mole of any gas (room temperature and pressure)

