SAI International School

Class - X

Chemistry (Module – 1)

Lesson Notes
Subject - Chemistry
Ch-Chemical Reactions and Equations
Topic-Characteristics of Chemical Reactions and Balancing Chemical Equations
Dt_17/3/2020
Suggested Video_ https://www.youtube.com/watch?v=8w9yRxBZzSo

Chemical reactions are the processes in which new substances with new **properties** are formed. Only a rearrangement of atoms takes place in a **chemical reaction**. The substances which take part in a **chemical reaction** are called reactants. ... In a **chemical reaction**, reactants are transformed into products.

Visually Observable Characteristics

1. **Change in color**.- One of the most easily observable changes, which may take place during a chemical reaction, is a change in color. Of course, if two different colored liquids combine, they will form a new color. This is not an indicator of a chemical reaction. If a new color emerges after a few seconds or minutes, however, then a chemical reaction may have taken place.
Ex-Rust forms on your bike when the iron in the metal frame reacts with the oxygen and water in the air. It forms a new compound called iron oxide. This change in color, from blue to reddish brown, indicates that a chemical change has taken place.

2. Temperature Change

When energy is either absorbed or released, it is indicative of a chemical change.
Ex- Fireworks are an example of a chemical change that produces a temperature change and emits light.

3. Gas Production

Production of gas is a clear sign that a chemical change has occurred. A quite delicious example of that is baking a cake. When you bite into a moist cake and see the tiny holes in the cake, this is indicative of the rising agent (either baking soda or baking powder) reacting with the acidic components of the cake to create carbon dioxide. This gas is what helps a cake rise in the oven.

4. **Change of state**-In some reactions, a change of a state is observed. The reaction starts with solid or liquid reactants and ends up with gaseous products and vice versa.

Example: Ammonia gas reacts with hydrogen chloride gas to form ammonium chloride which is in the solid state.

$NH_{3(g)} + HCl_{(g)} \rightleftharpoons NH_4Cl_{(s)}$

Suggested Video Link_https://www.youtube.com/watch?v=yZi9URUAWIc

Balanced chemical reaction is the reaction in which the no of atoms present in reactant side are equally present on product side.
Because of Law of Conservation of Mass, chemical equations must be balanced.

STEPS for Balancing Chemical Equations -There are four basic steps

1. Write the correct formula for the reactants and the products

2. Find the number of atoms for each element on the left side and Compare those against the number of the atoms of the same element on the right side.
3. Determine where to place coefficients in front of formulas - Left side must have same number of atoms as the right side for each element in order to balance the equation
4. Check your answer to see if: •The numbers of atoms on both sides of the equation are now balanced •

ASESSMENT

Topic Characteristics of Chemical Reactions & Balancing Equations

Date_17.03.2020

MCQs

Q1. A student added dilute HCI to a test tube containing zinc granules. The incorect observation is
a)The zinc surface became dull and black
b)A gas evolved which burnt with a pop sound
c)The solution remained colorless
d)The solution becomes green in color.

Q2. A dilute solution of sodium carbonate was added to two test tubes one containing dilute HCI (a) and the other containing dilute NaOH (b). the correct observation was :-
a)A brown colored gas liberated in test tube A
b)A brown colored gas liberated in test tube B
c)A colorless gas liberated in test tube A
d)A colorless gas liberated in test tube B

Q3. A balanced chemical equation is in accordance with

a)Avogadro's law

b)Law of multiple proportion

c)Law of conservation of mass

d)Law of gaseous volumes

Q4. The equation

$Cu + xHNO_3 \rightarrow Cu(NO_3)_2 + yNO_2 + 2H_2O$

The values of x and y are

a)3 and 5

b)8 and 6

c)4 and 2

d)7 and 1

Q5.In the following equation:

$Na_2CO_3 + xHCl \rightarrow 2NaCl + CO_2 + H_2O$, the value of x is

a)1

b)2

c)3

d)4

Q6. Which information is not conveyed by a balanced chemical equation?

(a) Physical states of reactants and products
(b) Symbols and formulae of all the substances involved in a particular reaction
(c) Number of atoms/molecules of the reactants and products formed
(d) Whether a particular reaction is actually feasible or not

Q7. In the decomposition of lead (II) nitrate to give lead (II) oxide, nitrogen dioxide and oxygen gas, the coefficient of nitrogen dioxide (in the balanced equation) is

(a) 1
(b) 2
(c) 3
(d) 4

Q8. When carbon dioxide is passed through lime water,

(a) calcium hydroxide is formed
(b) white precipitate of CaO is formed
(c) lime water turns milky
(d) colour of lime water disappears.

Q9. An element X on exposure to moist air turns reddish-brown and a new compound Y is formed. The substance X and Y are

(a) X = Fe, Y = Fe_2O_3
(b) X = Ag, Y = Ag_2S
(c) X = Cu, Y = CuO
(d) X = Al, Y = Al_2O_3

Q10. On immersing an iron nail in $CuSO_4$ solution for few minutes, you will observe

(a) no reaction takes place
(b) the colour of solution fades away
(c) the surface of iron nails acquire a black coating
(d) the colour of solution changes to pale green

Home assignment (To be done in the notebook)
Topic - Balancing chemical Equations
Date_17.03.202

Q1.Balance each of the following equations.

(a)Fe+Cl2 →FeCl3

(b)Fe+O2 →Fe2O3

(c)FeBr3+H2SO4 →Fe2(SO4)3+HBr

(d)C4H6O3+H2O →C2H4O2

(e)C2H4+O2 →CO2+H2O

(f)C4H10O+O2 →CO2+H2O

(g)C7H16+O2 →CO2+H2O

(h) $H_3PO_4 + HCl \rightarrow PCl_5 + H_2O$

(i) $Ca_3(PO_4)_2 + H_2SO_4 \rightarrow CaSO_4 + Ca(H_2PO_4)_2$

(j) $H_2SO_4 + Pb(OH)_4 \rightarrow Pb(SO_4)_2 + H_2O$

(k)C5H8O2+NaH+HCl $\rightarrow$C5H12O2+NaCl

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Q4, Q5, Q6, Q7 and Q8