**EMERALD ROYAL INTERNATIONAL SCHOOL, MPAPE ABUJA**

**LESSON PLAN AND NOTE FOR WEEK 2 ENDING12TH MAY, 2023**

**TERM: THIRD**

**WEEK : 2**

**DATE: 8TH - 12TH MAY, 2023**

**SUBJECT : CHEMISTRY**

**TOPIC : SULPHUR**

**SUB- TOPIC : compounds of sulphur.**

**PERIOD: 1ST**

**TIME : 8: 10 - 8 :50**

**DURATION:**  **40 minutes**

**CLASS: SS2**

**NUMBER IN CLASS:**  **3**

**AVERAGE AGE: 14 years**

**SEX: mixed**

**LEARNING OBJECTIVES: By the end of the lesson, the students should be able to;**

1. State the compounds of sulphur.
2. Explain their preparation.
3. State their uses.

**RATIONALE:** The students should understand the preparation and uses of compounds of sulphur.

**PREVIOUS KNOWLEGDE:** The student have been taught properties of sulphur.

**INSTRUCTIONAL MATERIALS:** A chart showing the compounds of sulphur and their properties.

**REFERENCE MATERIALS:** New school Chemistry for Senior Secondary Schools by Osei Yaw Ababio .

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| **STEPS** | **TEACHER’S ACTIVITIES** | **STUDENTS’ ACTIVITIES** | **LEARNING POINTS** |
| **INTRODUCTION** | The teacher introduces the lesson by reviewing the previous lesson. | The students were active. | To arouse the students interest. |
| **PRESENTATION**  **STEP 1** | The teacher lists the compounds of sulphur. | The students pay attention. | To keep them focus for better understanding. |
| **STEP 2** | The teacher explains the compounds of sulphur and asks the students to state the properties of each of the compounds of sulphur. | The students state the properties of each compounds of sulphur. | To encourage critical thinking. |
| **STEP 3** | The teacher states the uses of each compounds of sulphur. | The students pay attention. | To keep them focus for better understanding. |
| **BOARD SUMMARY** | **COMPOUND OF SULPHUR**  **SULPHUR IV OXIDE( SO4)**  **Laboratory Preparation of SO2**  Sulphur IV oxide which is also called sulphur dioxide.  Na2SO3 (s) + HCI (aq) → 2NaCI (aq) + H2O (I) + SO2 (g)  Or Na2SO3 (s) + H2SO4 (aq)  Na2SO4 (aq) + H2O  (l) +SO2 (g)  Gas is passed through conc. H2SO4 to dry it.  (ii) Heating a mixture of copper turnings and concentrated  tetraoxosulphate (IV) acid (sulphuric acid)    Equation of reaction taking place  Cu (s) + 2H2SO4 (aq) → CuSO4 (aq) +2H2O (l) + SO2 (aq)  **Physical Properties of SO2.**   1. Colorless gas with chocking odour.   2.Soluble in water to form acid solutions.  3.It is denser than air  **Chemical Properties**  **Chemical properties of sulphur iv oxide**  **1) As a reducing agent:**  Sulphur iv oxide acts as a reducing agent by supplying  electrons or gaining oxygen from other substances.  Examples include:  **a) The bleaching action**. This is due to sulphurous  acid which removes oxygen from the dye.  Equations of reaction  SO2 (g) + H2O (l)  H2SO3  (aq)  sulphurous acid  H2SO3 (aq) + [O]  H2SO4 (aq) + colourless  flower  (from dye of flower)  **b) With acidified potassium heptaoxochromate (VI)**  **potassium dichromate(VI) solution**  Equation of reaction:  K2Cr2O7 (aq) + 3SO2 (g) + H2SO4 (aq)  K2SO4  (aq) + Cr2(SO4)3 (aq) + H2O (l)  ***Observation***: Solution turns from orange (Cr +6) to  green (Cr +3  **c) With potassium tetraoxomanganate vii**  **(potassium permanganate) solution**.  Equation of reaction  2KMnO4 (aq) + 5SO2 (g) +2H2O (l)  K2SO4 (aq) + 2MnSO4 (aq) + 2H2SO4 (aq)  ***Observation* :** Solution turns from purple/pink to  colourless  **d) With iron(III) sulphate solution**  Iron(III) ions in solution are reduced by sulphur  dioxide to iron(II) ions.  **Equation of reaction**  Fe2 (SO4)3 (aq) + SO2 (g) + 2H2O (l)  2FeSO4 (aq) + 2H2SO4 (aq)  ***Observation*:** Solution turns from brown to green  **e) With bromine solution**  Bromine in reduced to bromide ions.  **Equation of reaction**  Br2 (aq) + 2H2O (l) + SO2 (aq)  H2SO4 (aq) + 2HBr (aq)  ***Observation*:** Solution turns from brown to  colourless  **f) With iodine solution**  Iodine is reduced to iodide ions.  I2 (aq) +2H2O (l) + SO2 (g)  H2SO4 (aq)  +2HI (aq)  Observation : Solution turns from brown to colourless.  **With sodium hydroxide solution :** With a little sulphur iv  oxide bubbled through an excess of the alkali, a normal salt  is formed but equal molar quantities react to form an acid  salt.  2NaOH (aq) + SO2 (g)  Na2SO3 (aq) + H2O (l)  **Excess**  NaOH (aq) + SO2 (g)  NaHSO3 (aq)  **Excess**  **Examples in which sulphur iv oxide acts as an**  **oxidising include:**  **With burning magnesium ribbon**  2Mg (s) + SO2 (g)  2MgO (s) + S (s)  **Observation:** Mixture of white and yellow solids deposited  at the bottom and sides of the jar.  **Explanation:** The burning metal gives out a lot of heat that  decomposes the gas into its elements sulphur and oxygen.  The metal then continues to burn in the oxygen formed.  **With hydrogen sulphide gas**  2H2S (g) + SO2 (g)  2H2O (l) + 3S (s)  **Observation:** Yellow solid of sulphur formed  (a) Magnesium burns in SO2 to form its oxide and sulphur  **Uses of SO2**  1. As a bleaching agent in paper industry.  2. Manufacture of H2SO4.  3. As a refrigerant for preservation of fruits  **TETRAOXOSULPHATE (VI) ACID AND ITS SALT**  Concentrated tetraoxosulphate (VI) acid is normally  manufactured industrially by Contact process, Steps  involved  (i) Sulphur is burnt in air S (s) + O2 (g) → SO2 (g) Sulphur (IV)  oxide reacts with excess air at 450  C in the presence of  vanadium (V ) oxide as  a catalyst.  2SO2(g) + O2(g) → 2SO3 (g )47  (ii) Sulphur (VI) oxide is then absorbed in moderately conc.  H2SO4 to form Oleum.  SO3 (g) + H2SO4 (aq) → H2 S2O7 (aq)  Oleum is then diluted with calculated amount of water to  form conc. H2SO4 of 98% concentrated.  H2S2O7 (aq) + H2O (I) → 2H2 SO4 (aq)  **Properties of H2 SO4**  When it reacts with an active metal, hydrogen is liberated.  Zn (g) + H2 SO4 (aq) → ZnSO4 (aq) + H2 (g)  ii) Oxidizing properties  C (s) + 2 H2SO4 (aq) → CO2 (g) + 2SO2 (g) + 2H2O (I)  Heat  Cu (s) + 2H2SO4 (aq) ) → CuSO4 (aq) + 2H2O (aq) + SO2 (g)  Dehydrating property –  C12 H22 O11 (s) ) H2SO4 (conc) → 12C (s) + 11 H2O (I)  Conc. H2SO4 is hygroscopic; hence, it is used in drying acid  gases e.g. CO2  **Uses of H2SO4**  1. Paints manufacture  2. Detergent manufacture  3. Lead accumulator  4. Tetraoxosulphate (vi) salt production  5. Fertilizer manufacture  6. As a drying agent for some gases  **Test for SO4– ions**  The test solution is acidified with dil. HCI. Add barium  chloride solution. A white precipitate of barium  tetraoxosulphate (VI) is formed - Ba2+ (aq) + SO4- (aq) ) →  BaSO4s)  **HYDROGEN SULPHIDE (H2S)**  Laboratory Preparation – It is prepared by the reaction  between moderately dilute HCI and iron (II) sulphide dried  over CaCI2 and collected by downward delivery.  FeS (s) + 2HCI (aq) → FeCI2 (aq) + H2S (g)  Properties of (H2S)  Colourless, poisonous gas, with smell of rotten eggs.  Turns blue litmus paper red.  It is soluble in water and denser than air.  Burns in air with blue flame.  2H2 S (g) + 3O2 (g) ) → 2 H2O (g) + 2SO2 (g) (unlimited supply)  2H2S (g) + O2 (g) ) → 2H2O (I) + 2S (I) (limited supply)  Reducing action:  Reduces iron (III) to iron (II).  2FeCI3 (aq) + H2S (s) ) → FeCI2 (aq) | The students ask question for clarification. | To create room for slow learners. |
| **EVALUATION** | The teacher evaluates the students with the following questions;   1. State any 3 compounds of sulphur. 2. Explain the preparation of any one stated above. 3. State 3 uses of any one stated above. | The students attempt the questions. | To ascertain their level of understanding. |
| **CONCLUSION** | The teacher concludes by copying note on the board. She checks and marks the note. | The students copy the note into their note books. | For future use. |
| **HOME WORK** | Draw the kipps apparatus and state its uses. | The students did their assignment and submit for marking and correction. | To encourage the students to study at home. |



10/5/2023

Principal Head Instuctor