**EMERALD ROYAL INTERNATIONAL SCHOOL, MPAPE ABUJA**

**LESSON PLAN AND NOTE FOR WEEK 4 ENDING 26TH MAY, 2023**

**TERM: THIRD**

**WEEK : 4**

**DATE: 22ND - 26TH MAY, 2023**

**SUBJECT : CHEMISTRY**

**TOPIC : CARBON AND ITS COMPOUNDS**

**SUB- TOPIC : 1. oxide of carbon.**

1. **Preparation of carbon (iv) oxide.**
2. **Test and uses of carbon (iv) oxide.**

**PERIOD: 1ST**

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

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

**CLASS: SS1**

**NUMBER IN CLASS: 7**

**AVERAGE AGE: 14 years**

**SEX: mixed**

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

1. State the oxide of carbon.
2. Explain the preparation of carbon (iv) oxide.
3. State the test and uses of carbon (iv ) oxide.

**RATIONALE:** The students should understand the oxide of carbon.

**PREVIOUS KNOWLEGDE:** The student have been taught gaseous fuel.

**INSTRUCTIONAL MATERIALS:** A chart showing the apparatus for preparing oxide of carbon.

**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 explains the oxides of carbon and the preparation of carbon (iv) oxide. | The students pay attention. | To keep them focus for better understanding. |
| **STEP 2** | The teacher asks the students to state the test for carbon(iv) oxide. | The students state the test for carbon(iv) oxide. | To encourage critical thinking. |
| **STEP 3** | The teacher states the uses of carbon(iv) oxide. | The students pay attention. | To keep them focus for better understanding. |
| **BOARD SUMMARY** | **OXIDES OF CARBON**  There are two oxides of carbon, carbon (IV) oxide and  carbon (II) oxide. This is because carbon has two valencies,  which are 2 and 4. Carbon (II) oxide is formed when carbon  uses the valency of 2 during chemical combination with  oxygen, as in CO, while carbon (IV) oxide is formed when  carbon uses the valency of 4, as in CO2. Carbon (IV) oxide  is more common than carbon (II) oxide; this is because  carbon (IV) oxide is readily formed due to the abundance of  oxygen in air. However, when the supply of oxygen is  limited for any reason, carbon (II) oxide is formed instead.  **Carbon IV oxide (CO2)**  Carbon iv oxide occur freely in the atmosphere, constituting  0.03% by volume of atmospheric gases; It is commonly  obtained from the exhalation of man and animals as well as  from complete combustion of fuel. In combined form, it  occurs as metallic trioxocarbonate (iv) and hydrogen  trioxocarbonate (iv), especially in limestone regions and  coral reefs. A small percentage of carbon (iv) oxide is also  found in dissolved form in water, forming a dilute solution  of hydrogen trioxocarbonate iv acid.  **preparation of CO2**  1. It is prepared in the laboratory by the action of  dilute acids on trioxocarbonate iv, or on a hydrogen  trioxocarbonate (iv). Calcium trioxocarbonate (iv)  (also called limestone) in the form of marble chips  is used with dilute hydrochloric acid (HCl) or  trioxonitrate (v) acid (HNO3).  CaCO3(s) + HCl(aq) → CaCl2(aq) + CO2(g) + H2O(l)  **DRAW THE LAB PREPARATION FROM YOUR**  **TEXTBOOK**  NOTE: Dilute H2SO4 cannot be used instead of dil. HCl or  dil. HNO3 because it forms an insoluble calcium  tetraoxosulphate (VI) which covers the marble chips  (CaCO3) and prevents further reaction.  2. Carbon (iv) oxide is also formed by heating metallic  trioxocarbonate (IV) except that of sodium and potassium),  or by heating a hydrogen trioxocarbonate iv of sodium or  potassium.  For example when calcium trioxocarbonate (IV) or copper  II trioxocarbonate (IV) is heated.  CaCO3(s) → CaO(s) + CO2(g)  CuCO3(s) → CuO(s) + CO2(g)  For example when sodium hydrogen trioxocarbonate iv are  heated  NaHCO3 → Na2CO3 + CO2 + H2O  KHCO3 → Na2CO3 + CO2 + H2O  ***Draw the diagrams here from your textbook please!***  **Physical properties of CO2**  It is colorless, odourless with a sharp, refreshing taste (This  is why it is used in preserving drinks)  It is soluble in water  It is about 1.5times denser than air  On cooling, it readily liquefies and solidifies to form dry ice.    **Chemical Properties of CO2**  1. It reacts with water to form trioxocarbonate iv acid  CO2 + H2O → H2CO3  Note: When trioxocarbonate iv acid (H2CO3) it  decomposes to form carbon iv oxide and water.  H2CO3 → CO2 + H2O  2. It reacts with alkalis (NaOH and KOH) to form salt and  water only. For example, it reacts with sodium  hydroxide to sodium trioxocarbonate iv salt and water  only.  NaOH + CO2 → Na2CO3 + H2O  3. It reacts with burning magnesium to form magnesium  oxide ash and carbon deposit.  Mg + CO2 → MgO + C  NOTE: Carbon iv oxide does not support combustion  but supports burning magnesium, why? This is because  the intense heat released by burning magnesium  decomposed CO2 to liberate hydrogen which promote  the burning; consequently, magnesium is oxidized to  magnesium oxide ash and CO2 is reduced to carbon.  4. It reacts with red-hot coke to form carbon II oxide (CO)  CO2 + C → 2CO  5. It turns a moist blue litmus paper red.  **Test for CO2**  Bubble the unknown gas through lime water (calcium  hydroxide). If the solution turned milky, then the gas is CO2,  but if the solution does not then the gas is not CO2.  CO2(g) + Ca(OH)2 → CaCO3(s) + H2O(l)  NOTE: The milkiness is due to the precipitation of insoluble  calcium trioxocarbonate iv. However, milkiness disappears  when excess CO2 is passed due to the formation of soluble  calcium hydrogen trioxocarbonate iv.  CaCO3(s) + H2O(l) + CO2(g) → CaHCO3(s)  However, when the solution is heated a clear solution is  formed due to the decomposition of calcium  hydrogen-trioxocarbonate iv (CaHCO3) to form calcium  trioxocarbonate iv, CaCO3 and CO2 is liberated.  CaHCO3(s) → CaCO3(s) + H2O(l) + CO2(g).  **Uses of Carbon IV oxide**  1. It is used as a fire extinguisher (because it does not  support combustion and it is denser than air)  2. It gives carbonated (aerated) drinks refreshing taste.  3. It is used in producing health salts  4. It is used in the manufacture of some compounds such as  sodium trioxocarbonate iv(Na2CO3), sodium  hydrogen trioxocarbonate iv (NaHCO3)  5. It is used in the form of baking powder along with yeast  to generate CO2 which make dough to rise.  6. Solid CO2 (dry ice) is used as a refrigerant for perishable  goods  7. It is used as a coolant in nuclear reactors. | The students ask question for clarification. | To create room for slow learners. |
| **EVALUATION** | The teacher evaluates the students with the following questions;   1. State the oxides of carbon. 2. State the ways of preparing carbon(iv) oxides and explain any one. 3. State at least 3 chemical properties of carbon(iv) oxide. 4. State at least 2 test for carbon(iv)oxide. 5. State at least 3 uses of carbon(iv)oxide. | 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 notes. | The students copy the note into their note books. | For future use. |
| **HOME WORK** | Draw the apparatus for the laboratory preparing of carbon(iv)oxide. | The students did your assignment and submit for marking and correction. | To encourage the students to study at home. |



9/5/2023

Principal Head Instuctor