CREST Olympiads

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CREST Science Olympiad (CSO)
Worksheet for
Class 8

Topic

Metal and Non-Metals

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Worksheet on Metal and Non-Metals

1. **In a displacement reaction experiment, a piece of zinc metal is added to a copper sulphate solution. The setup involves placing zinc in the solution and observing the changes. What will be the colour change in the solution after some time?**

   a. The solution will turn blue.
   b. The solution will turn green.
   c. The solution will turn colourless.
   d. The solution colour will remain the same.

2. **Which of the following reactions accurately represents the reaction of metals with water to produce metal oxides and hydrogen gas?**

   a. $2H_2O + 2Na \rightarrow 2NaOH + H_2$
   b. $2H_2O + Ca \rightarrow Ca(OH)_2 + H_2$
   c. $2H_2O + 2Mg \rightarrow 2MgO + H_2$
   d. $2H_2O + Fe \rightarrow FeO + H_2$

3. **Identify the correct sequence of steps involved in the extraction of metals from their ores.**

   a. Enrichment, Refining, Extraction
   b. Refining, Extraction, Enrichment
   c. Extraction, Enrichment, Refining
   d. Extraction, Refining, Enrichment

4. **In the following question, you will find an assertion and a reason. Select the appropriate option that applies.**

   Assertion: Non-metals are generally brittle.
   Reason: The arrangement of atoms in non-metals does not allow for the movement of atoms or layers, making them unable to withstand deformation without breaking.

   a. Both the assertion and reason are true, and the reason is the correct explanation of the assertion.
   b. Both the assertion and reason are true, but the reason is not the correct explanation of the assertion.
   c. The assertion is true, but the reason is false.
   d. The assertion is false, but the reason is true.

5. **A student wants to extract silver metal from its ore, argentite (Ag_2S). Which of the following experimental procedures would be the most appropriate for this purpose?**

   a. Electrolyzing the molten argentite
   b. Heating argentite in the presence of oxygen
   c. Reacting argentite with a strong acid
   d. Roasting argentite in the presence of carbon

Answer Key

1. c - In the displacement reaction between zinc and copper sulphate, zinc is more reactive than copper. Zinc displaces copper from its compound, resulting in the formation of zinc sulphate and copper metal. The blue colour of the copper sulphate solution is due to the presence of copper ions (Cu^{2+}) in the solution. As zinc displaces copper, the blue colour fades away, indicating that copper has been removed from the solution.

2. c - When magnesium (Mg) reacts with water (H_2O), it forms magnesium oxide (MgO) and hydrogen gas (H_2). This is a typical example of a metal reacting with water to produce a metal oxide and hydrogen gas.

3. c - The correct sequence of steps involved in the extraction of metals from their ores is as follows: first, the metal is extracted from the ore (Extraction), then the ore is concentrated to remove impurities (Enrichment), and finally, the impure metal is refined to obtain the pure metal (Refining).

4. a - The assertion states that non-metals are generally brittle, which is true. The reason provided explains why non-metals are brittle by pointing out that the arrangement of atoms in non-metals does not allow for the movement of atoms or layers, making them unable to withstand deformation without breaking. This explanation aligns with the observation that non-metals tend to break easily when subjected to stress, confirming the accuracy of both the assertion and the reason.

5. d - Since silver is a less reactive metal, it can be extracted from its ore, argentite, using a relatively simple method. In the extraction process, argentite is heated in the presence of oxygen (roasting) to convert it into silver oxide and sulfur dioxide. Then, silver oxide is further reduced to pure silver metal by reacting it with carbon (usually in the form of coke). The result of this reaction is the extraction of silver metal from the argentite ore.

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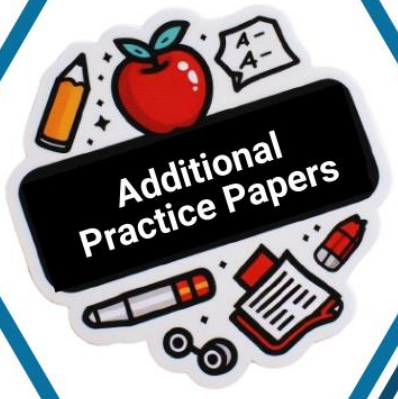

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