

Periodic and families relationship of typical element - lab report example



Periodic and families relationship of typical element

PERIODIC AND FAMILY RELATIONSHIP OF TYPICAL ELEMENTS Paper This

writing will help in understanding the relationships of elements in a periodic table. It will also focus on how some of the elements react with oxygen. The type of oxides they form and how this depends on which group or family an element belong.

Introduction

This report discusses an experiment to demonstrate that there exists periodic and family relationship of typical elements in the periodic table. Each element from across the chemical group or family is reacted with oxygen to form oxides. These oxides are then tested to determine if they are bases, acids or amphoteric. The report focus on demonstrating that most element within the same family or group exhibit similarity in their chemical reactions. Across the period, however, they show very different chemical behavior. These similarities and differences helps in grouping, and classifying the elements on the periodic table . (GreenWood)

Experimental section - methods

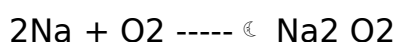
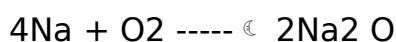
Materials involved in the experiment are standard laboratory equipment, samples of Sodium (Na), Magnesium (Mg), Aluminum (Al), Carbon(C), Sulfur(S), and water (H₂O). Each element is then burnt in oxygen, and later further adding water and acid test their resulting oxides. The data and observations are as follows

Data and Observations

If a little quantity sodium is burnt in air, it often burns with an orange glow. A

larger quantity of sodium burns with a strong orange flame in oxygen. The result is usually a white solid mixture of sodium oxide and in some instances, sodium peroxide is produced. (van Spronsen)

The equation of the reaction between Sodium and Oxygen.

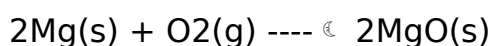


Sodium and Cesium are metals from group 1 elements on the periodic table.

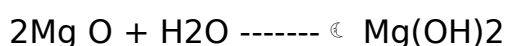
Cesium is more reactive than Sodium. These elements burn in oxygen to produce metal dioxides. Potassium is also an element in this group.

Magnesium belongs to group 2 in the periodic table; it is reacted with Oxygen to form Magnesium Oxide. The chemical properties of elements in this group are marked by the high reducing power of these metals. It is worth to note that these elements are more electropositive down the Group.

Metals of this group react vigorously with oxygen. (Mazurs)

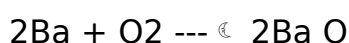


When Magnesium Oxide is put in water, the result is Magnesium Hydroxide.

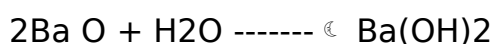


Reaction between barium and Oxygen

Barium is also in group 2 just like Magnesium, when reacted with Oxygen it forms barium Oxide



Adding barium Oxide in water Barium hydroxide is formed



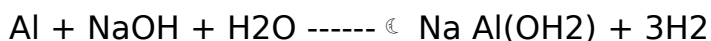
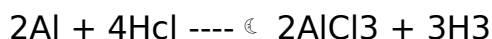
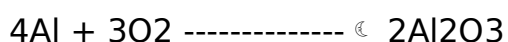
Magnesium and Barium belongs to the same group in the periodic table.

Magnesium reacts with HCl and fails to react with NaOH

Aluminum is an element belonging to group 3 in the periodic table.

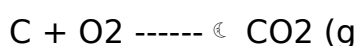
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Aluminum reacts with oxygen to form aluminum oxide

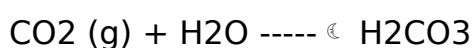


Aluminum is less reactive than Magnesium and Sodium

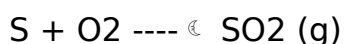
Carbon is an element that belongs to group 4 in the periodic table. This substance reacts with oxygen to form carbon dioxide. Carbon is classified as a non-metal



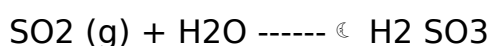
If the oxide is added into water, carbonic acid is form.



Lab 6 Sulfur is a group 6 element; sulfur (S) non-metallic element. When sulfur is burnt in Oxygen, it results into Sulfur Dioxide.



When Sulfur Dioxide is diluted in water, an acidic substance called sulfurous acid is formed.



Results and discussion

The table 1 below is a recording of the results and observation made in all the labs

Table 1

Sodium(Na)

Magnesium(Mg)

Aluminum(Al)

Carbon(C)

Sulfur(S)

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Group

1

2

3

4

6

Oxides

Na₂ O₂

Mg O

Al₂ O₃

C O₂

SO₂

Type

Basic

Basic

amphoteric

acidic

acidic

Group 1 and group 2 elements are metallic by nature; they burn in Oxygen to produce Metal Oxide. When these metals are put in water, they form basic substances. Aluminum is also classified as a metal, although and it belongs to group 3 called transitional metals in the periodic table. Aluminum Oxide though form amphoteric substance since it reacts as both the basic and acid. In the reactivity series, Aluminum metal is less reactive with Oxygen compared to both Sodium and Magnesium.

Conclusion

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As with all chemical families, group 1 elements share traits. They are very reactive. This is because they all have only one electron in their outer shell, which is very easily lost during chemical reactions. Their rate of reaction increases down the Groups. They are all metals, with shiny surface. This group includes elements such as Sodium(Na) and potassium (K) among others. Group 2 elements are the second most reactive family of elements in the periodic table after group 1 elements. This group has elements like magnesium (Mg), calcium (Ca), barium (Ba) among others. They react by losing two outer most electrons. The oxides of the elements are basic (Mazurs)

The results of the experiments show that all chemical families or groups share some specific traits. These traits include electrovalence number, chemical reaction with other elements like Oxygen, acids and the type of salts they produce. Group 4 through to group 6 are nonmetallic and their oxides are acidic (van Spronsen)

References

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