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Environment, Water

Abstract

Introduction

The objective of this laboratory work is to gain an insight in the trends of both chemical and physical properties of elements across the periodic table. The experiments offer an opportunity to subject the elements to the same chemical conditions and observe the reactions. Moreover, the relationship of the chemical properties and the location in the periodic table is pertinent. The location of an element in the periodic table is determined by its family or group and period.

Experimental

The procedure followed for the different experiments involved combustion and reaction with water. For combustion the element would be brought close to flame. On the other hand reaction with water was through introduction of the element in a spatula

Data and results

The reactions of group one elements are as shown below:

Na(s) + O2(g) Na2O2(g)

2Na 2O2(s) + H2O(l) H2O2(g) + 2NaOH(aq)

The reactions of group two elements are as shown below:

2Mg(s) + O2(g) 2MgO(g)

2MgO(g) + H2O(l) 2Mg(OH)2(aq)

BaO+ H2O(l) Ba(OH)2(aq)

The reactions of group three elements are as shown below:

4Al(s) + 3O2(g) 2Al2O3(g)

2Al(s) + 6 HCL(aq) 2AlCl3(aq) + 3 H2

Al(s) + NaOH(aq) + H2O(l) NaAlC(OH)4l3(aq) + 3 H2

The reactions of group four elements are as shown below:

C(s) + O2(g) CO2(g)

CO2(g) + H2O2(g) H2CO3

The reactions of group six elements are as shown below:

S(s) + O2(g) SO2(g)

SO2(g) + H2O2(g) H2SO3

Discussion

Group one elements are highly reactive compared to elements in other groups. This was evidence by the explosive reaction of sodium. Cesium is more reactive than sodium. The reactivity of the group two elements increase with the decrease in the periodic number of the element. MgO is more reactive than BaO with water. The reaction of magnesium with acids is exothermic. on the other had magnesium does not react with a base such as the NaoH solution. This is because sodium hydroxide is a very strong alkali. However, the reaction with the acid involves a two stage reaction where the final reaction is the neutralization reaction. This is because of the avail the reactivity of the group three elements changes with the period of the element. The reactivity of Al is lower than that of sodium Na and magnesium Mg. this is because these two elements belong to a group that is lower than

Al. Sodium Na belongs to group one whereas magnesium Mg belongs to group two.

In the combustion of Al there is a requirement for heat to trigger the reaction.

The combustion of different elements yields oxide which varies in characteristic. Group one elements yield oxides that are basic in nature. Moreover, group two elements yield oxides that are basic and have a relatively lower pH level than group one elements. Groups 4 and 6 yield oxides that are acidic in nature. However, group four elements yield oxides that are neither acidic nor basic.

Conclusion

The laboratory exercise was successful and the multiple observations made on the variations of chemical properties of different elements across the periodic table. From the observations trends on the relationships between typical elements in the periodic table were drawn. The experiments were instrumental in offering an insight is the relationships.