

### S-Block Element

Hari Mohan Prasad Singh  
 Department of Chemistry  
 Dr. L.K.V.D. College, Tarapur, Samastipur  
 L.N. Mithila University, Darbhanga, India  
 E-mail: hari.mohan.prasad.3216@gmail.com

The elements of Group 1 and Group 2 of the modern periodic table are called s block elements. The two types of s block elements are possible i.e. the elements with one electron (s1) or the elements with two electrons (s2) in their s-subshell.

S block comprises of 14 elements: hydrogen (H) Lithium (Li) helium (He) Sodium (Na) beryllium (Be) potassium (K) magnesium (Mg) rubidium (Rb) calcium (Ca) cesium (Cs) strontium (Sr) francium (Fr) barium (Ba) and radium (Ra)

### Hydrides

Compounds of hydrogen with less electronegative elements are known as hydrides. So when hydrogen reacts with any other element the product formed is considered to be a hydride. If we closely observe the <sup>periodic</sup> table hydrides formation is not seen from VA group elements and this condition is known as hydride gap. Hydrogen molecule usually reacts with many elements except noble gases to form hydrides. However, the properties may vary depending on the type of intermolecular force that exists between the elements, its molecular mass, temperature, and other factors.

### Types of Hydrides

Hydrides are mainly divided into three major types or groups. The categories are decided based on what elements the hydrogen forms bonds with or simply on the basis of chemical bonding the three types of hydrides are ionic, covalent, and metallic hydrides.

### Ionic or Saline Hydrides

They are formed when hydrogen molecule reacts with highly electropositive s-block elements (Alkali metals and Alkaline Earth Metals) in solid state. The ionic hydrides are crystalline, non-conducting and non-volatile. However in a liquid state, they conduct electricity ionic hydrides on electrolysis liberate hydrogen gas at the anode. Saline or ionic hydrides does not dissolve in conventional solvents and they are mostly used as bases or reducing reagents in organic synthesis e.g. NaH, KH, CaH<sub>2</sub> etc. These contain hydrogen as the negatively charged (H<sup>-</sup>) ion

## Covalent Hydrides

Covalent hydrides are formed when hydrogen reacts with other similar electronegative elements like Si, C etc. The most common examples are  $\text{CH}_4$  and  $\text{NH}_3$ . In general, compounds that are formed when hydrogen is reacted with non-metals are called covalent hydrides. The compound shares a covalent bond and are either volatile or non-volatile compounds. Covalent hydrides are also either liquids or gases.

e.g. Covalent Hydrides:  $\text{SiH}_4$  (Silane)

## Metallic Hydrides

A hydrogen compound that forms a bond with another <sup>metal</sup> element is classified as a metal hydride.

The bond is mostly covalent type but sometimes the hydrides are formed with ionic bonds. These are usually formed by transition metals and are mostly non-stoichiometric, hard, high melting and boiling points.

e.g. of Metallic Hydrides TiH, aluminium, cadmium, magnesium etc.

## Uses of Hydride

- They are used as reducing agents in many chemical industries.
- Hydrides are highly significant in battery storage technologies such as nickel hydride batteries.
- They are used as drying agents.
- They are used as strong bases in organic synthesis.

HMSingh

Mobil No- 9835843216