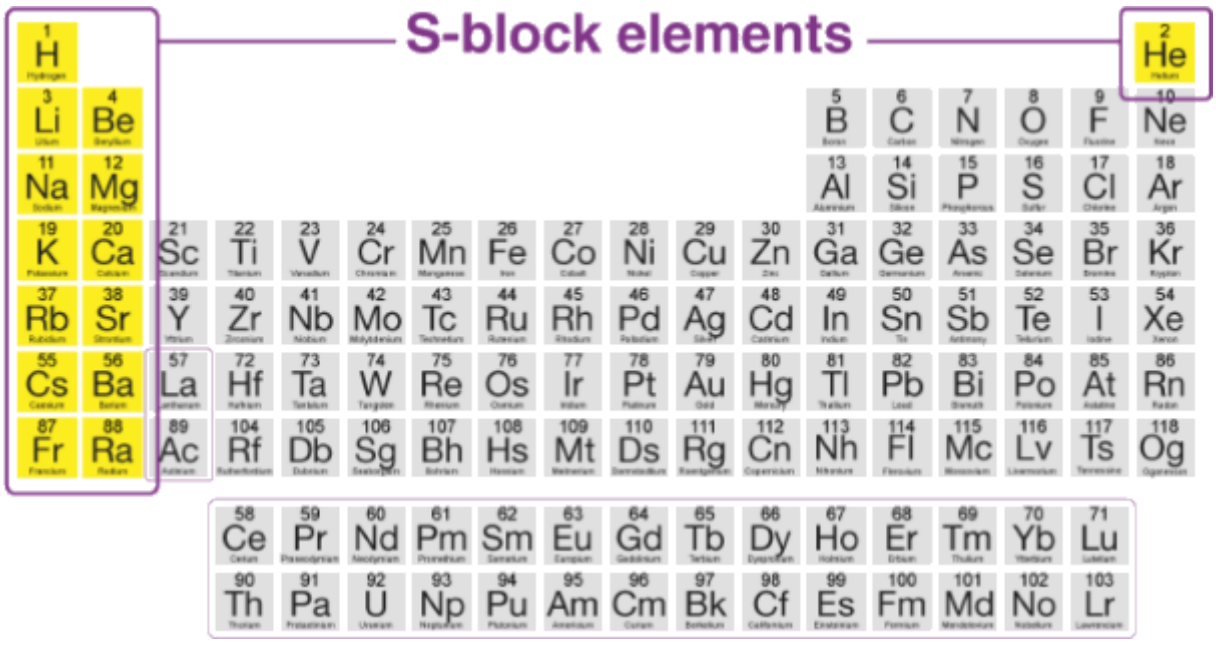
The S-Block Element: S Block Elements, Periodic Trends in Properties of Elements (For CBSE, ICSE, IAS, NET, NRA 2022)



- The group 1 and group 2 elements of the periodic table are called the s-block elements.

- The group 1 elements are alkali metals, and the group 2 elements are alkaline earth metals
- They are named so because of the alkaline nature of the hydroxides and oxides.
- Alkaline earth metals are characterized by two s-electrons, whereas alkali metals by one s-electron in the valence shell of their atoms.
- These metals form mono positive and dispositive ions and are extremely reactive.

S Block Elements

- The s block elements having only one electron in their s-orbital are called group one or alkali metals whereas the s block elements having two electrons filling their s-orbital are called group two or alkaline earth metals.
- The **s-block** in the periodic table of **elements** occupies the alkali metals and alkaline earth metals, also known as groups 1 and 2.
- The electrons present in an atom occupy various sub-orbitals of available energy levels in the order of increasing energy.
- The last electron of an atom may find itself in either of the **s, p, d, and f subshells**.
- Helium is also part of the **s block**. The principal quantum number “n” fills the s orbital.
- Accordingly, the elements of the atom having their last valence electron present in the s-suborbital are called the s block elements.

Periodic Trends in Properties of Elements

Periodic property	Trend in	
	groups	periods
	From top to bottom	From left to right
Valency		
Atomic radius	Increasing	Decreasing
Ionisation energy	Decreasing	Increasing
Electron affinity	Decreasing	Increasing
Electronegativity	Decreasing	Increasing
Electropositivity	Increasing	Decreasing
Metallic nature	Increasing	Decreasing
Non-Metallic nature	Decreasing	Increasing

- Periodic trends are specific patterns in the properties of chemical elements that are revealed in the periodic table of elements.
- Major periodic trends include electro negativity, ionization energy, electron affinity, atomic radii, ionic radius, metallic character, and chemical reactivity.
- **Alkali metal** – These metals are silvery-white, low melting, soft and highly reactive.
- Ionic size as well as the atomic size increases downs the group. On the other hand, the ionization enthalpies decrease down the group.
- These compounds are mostly ionic.
- Hydroxides and oxides dissolve in water to form strong alkalies. Some compounds of sodium are sodium chloride, sodium hydrogen carbonate, etc.
- Manufacturing of Sodium hydroxide is done by the Castner-Kellner process and manufacturing of sodium carbonate is done by the Solvay process.

- **Alkaline earth metals** – Metals have increased cationic charges. Their ionic size, as well as atomic size, is reduced.
- Hydroxides and oxides of alkaline earth metals are less basic.
- Some compounds of calcium are calcium carbonate, calcium hydroxide, etc.
- **Diagonal relationship** – The first element of group 1 and the second element in group 2 show similar properties i.e. Lithium from group 1 and Beryllium in group 2.
- So, similarities are called diagonal relationship.