INTRODUCTION :

- II – A group elements are metals and their oxides are basic. Therefore they are called alkaline earth metals.
- The alkaline earth metals are beryllium (Be) magnesium (Mg), calcium (Ca), strontium (Sr), barium (Ba) and Radium (Ra).
- The radioactive alkaline earth metal is Ra.
- They belong to S – block as the differentiating electron enters into 'S' – sub shell.
- Madam Curie discovered 'Ra' from the mineral Pitchblende.
- The general outer electronic configuration of alkaline earth metals is ns^2.
- Penultimate shell configuration : Be $\rightarrow$ $(n-1)s^2$ Mg, Ca, Sr, Ba, Ra $\rightarrow$$(n-1)s^2 p^6$
  No element contains 18 electrons in the penultimate shell.
- The typical elements among alkaline earth metals are Be and Mg.
- The oxides and hydroxides of IIA group elements are alkaline and are more available in earth's crust and hence they are called alkaline earth metals.

General properties:

- **Abundance :** Ca is more abundant and Ra is least abundant.
- **Density :** It first decreases from Be to Ca and then increases down the group.
- Melting and Boiling points : No regular trend is observed in MP and BP's.
- Be has highest MP and BP values.
- Mg has lowest MP and BP values.
- **Atomic radius** : It increases down the group.
- **Electronegativity** : It decreases down the group.
- **Metallic nature** : All are metals and metallic nature further increases down the group.
- **Ionisation potential** : It decreases down the group.
- **Oxidation state:** They commonly exhibit + 2 oxidation state. Inspite of much higher I_2 value, still they exhibit + 2 oxidation state due to greater hydration energy.
- **Hydration Energy :** Hydration energy is higher than those of alkali metal ions.
- It decreases from Be^{2+} to Ba^{2+} with increase in size.
- **Flame test** : Be and Mg do not give flame test due to the much smaller size. Other elements of the group give flame test due to their large sizes and low ionisation potential values.
- Ca $\rightarrow$ Brick red, Sr $\rightarrow$ Crimson Red, Ba $\rightarrow$ apple green.
- **Diamagnetic nature :** Their ions are diamagnetic due to the absence of unpaired electron.
- **Standard Oxidation Potential (SOP) Values** : SOP values are + ve and increase from Be to Ba as ionisation potential decreases.

  Minerals of Alkaline earth metal:

- Beryl – $3\ BeO\ .Al_2O_3.\ 6SiO_2$
- Phenacite – $2BeO.SiO_2$
- Calcite, Aragonite, Marble – $CaCO_3$
- Fluorapatite – $3Ca_3(PO_4)_2\ .CaF_2.$
- Anhydrite – $CaSO_4$
- Celestite – $SrSO_4$
- Strontianite – $SrCO_3$
- Barytes, heavy spar – $BaSO_4$
- Whitherite – $BaCO_3$
- Pitchblende, uranite – U_3O_8