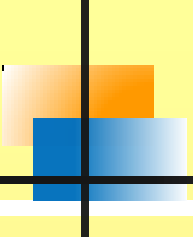
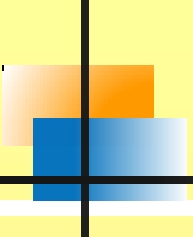




# **ALKALINE EARTH METALS**

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- **In alkaline earth metals the properties such as metallic nature, reducing nature, reactivity, electropositive character and ionic nature of compounds increases from Be to Ba whereas the complex formation tendency decreases.**
  - **Density of calcium is less than that of magnesium due to the presence of vacant 3d –orbitals leading to much increase in atomic volume.**
  - **Since the alkaline earth divalent ions have no unpaired electrons, these are diamagnetic and colourless.**

- 
- The hydride of Be can be prepared indirectly by reducing  $\text{BeCl}_2$  with lithium aluminium hydride  
$$2 \text{BeCl}_2 + \text{LiAlH}_4 \rightarrow 2 \text{BeH}_2 + \text{LiCl} + \text{AlCl}_3$$
  - Like alkali metals, alkaline earth metals also dissolve in liquid ammonia giving coloured solutions which are good conductors of electricity.
  - Only Mg displaces hydrogen from a very dilute  $\text{HNO}_3$ .
  - Aqueous  $\text{Ba}(\text{OH})_2$  is known as baryta water.
  - Anhydrous  $\text{CaCl}_2$  is a good desiccant but it can not be used to dry alcohol and ammonia as it forms addition products with them.
  - $\text{BeF}_2$  is soluble whereas fluorides of Mg, Ca, Sr and Ba are insoluble in water. Solubility decreases in the order:  
 $\text{BeF}_2 > \text{MgF}_2 > \text{CaF}_2 > \text{SrF}_2 > \text{BaF}_2$ .

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- **Solubility of chlorides, bromides and iodides decreases in the order:**



- **Solubility of sulphates and carbonates decreases in the order:**

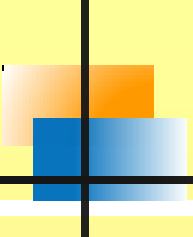


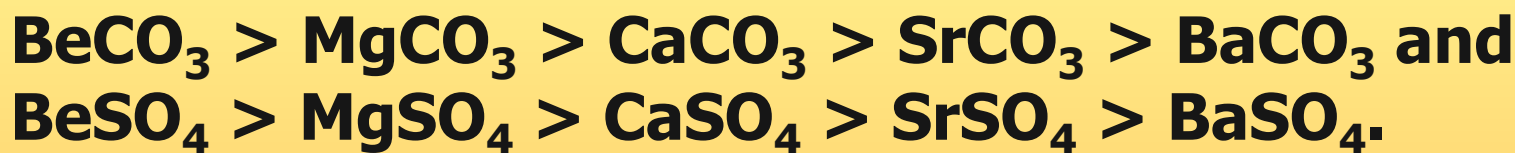
**Whereas the solubility of hydroxides increases in the order:**



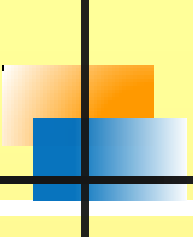
- **Basic character of oxides and hydroxides increases in the order:**



- 
- **Thermal stability of carbonates and sulphates increases down the group from Be to Ba. The correct order is :**



- **Melting points of halides decrease as the size of the halogen increases. The correct order is:**  
$$\text{MF}_2 > \text{MCl}_2 > \text{MBr}_2 > \text{MI}_2.$$
- **The ionization enthalpy of radium is higher than that of barium.**
- **Magnesium ions are present in chlorophyll- a green colouring pigment in plants which absorbs light and is essential for photosynthesis.**

- 
- **Calcium ions play an important role in muscle contraction.**
  - **Gypsum  $\text{CaSO}_4 \cdot 2\text{H}_2\text{O}$  is also known as alabaster.**
  - **Calcium is present in the soil, plants, bones as  $\text{Ca}_3(\text{PO}_4)_2$  and egg shells etc.**



## Points to be Remembered

- All are silvery white metals.
- All can decomposes water; exception is Be.
- $\text{Ba}(\text{OH})_2$  is baryta water,  $\text{Mg}(\text{OH})_2$  is milk of magnesia.
- $\text{M}_3\text{N}_2$  types of nitrides are formed; only  $\text{Be}_3\text{N}_2$  is volatile.
- The most important complex formed by Mg is chlorophyll.
- $\text{MgCl}_2 \cdot 5\text{MgO} \cdot \text{XH}_2\text{O}$  is Sorel cement used in dentistry.
- In tooth paste Magnesia alva  $\text{MgCO}_3 \cdot \text{Mg}(\text{OH})_2 \cdot 3\text{H}_2\text{O}$  is used.
- $\text{CaSO}_4 \cdot 1/2\text{H}_2\text{O}$  is known as plaster of paris.
- $\text{MSO}_4$  type of sulphates are formed; they are generally insoluble in water except  $\text{BeSO}_4$  &  $\text{MgSO}_4$ .



## Check Your Knowledge

**Q.** The correct order of increasing thermal stability of  $\text{K}_2\text{CO}_3$ ,  $\text{MgCO}_3$ ,  $\text{CaCO}_3$  and  $\text{BeCO}_3$  is :

- (a)  $\text{K}_2\text{CO}_3 < \text{MgCO}_3 < \text{CaCO}_3 < \text{BeCO}_3$
- (b)  $\text{BeCO}_3 < \text{MgCO}_3 < \text{K}_2\text{CO}_3 < \text{CaCO}_3$
- (c)  $\text{BeCO}_3 < \text{MgCO}_3 < \text{CaCO}_3 < \text{K}_2\text{CO}_3$
- (d)  $\text{MgCO}_3 < \text{BeCO}_3 < \text{CaCO}_3 < \text{K}_2\text{CO}_3$

**Ans. (c)**

**Q.** Among the following compounds of cement which is present in the highest amount ?

- (a)  $\text{Ca}_2\text{SiO}_4$
- (b)  $\text{Ca}_3\text{SiO}_5$
- (c)  $\text{Al}_2\text{O}_3$
- (d)  $\text{Ca}_3\text{Al}_2\text{O}_6$

**Ans. (b)**





**Q. Which pair of the following chlorides do not impart colour to the flame ?**

**(a)  $\text{BeCl}_2$  and  $\text{SrCl}_2$**

**(b)  $\text{BeCl}_2$  and  $\text{MgCl}_2$**

**(c)  $\text{CaCl}_2$  and  $\text{BaCl}_2$**

**(d)  $\text{BaCl}_2$  and  $\text{SrCl}_2$**

**(e)  $\text{MgCl}_2$  and  $\text{CaCl}_2$**

**Ans. (b)**

**Q. Which of the following on thermal decomposition yields a basic as well as an acidic oxide ?**

**(a)  $\text{KClO}_3$**

**(b)  $\text{Na}_2\text{CO}_3$**

**(c)  $\text{NaNO}_3$**

**(d)  $\text{CaCO}_3$**

**(e)  $\text{NH}_4\text{NO}_3$**

**Ans. (d)**



**Thank you .**