

## Chemistry Worksheet Class 11 on Chapter 10 The s-Block Elements with Answer – Set 2

**Q1.** Which of the following is not a lithium ore?

- (a) Petalite
- (b) Albite
- (c) Triphylite
- (d) None of the above

**Answer:** (b) Albite is not a lithium ore.

**Q2.** Which of the following is a radioactive alkali metal?

- (a) Francium
- (b) Radium
- (c) Both (a) and (b)
- (d) None of the above

**Answer:** (a) Francium is a radioactive alkali metal.

**Explanation:** Francium and radium are radioactive, but francium belongs to group 1 (alkali metal) series, and radium is in group 2 (alkaline earth metal). Thus, only francium is a radioactive alkali metal.

**Q3.** Which of the following is the correct stability order of alkali metal chlorides?

- (a)  $\text{LiCl} > \text{KCl} > \text{NaCl} > \text{CsCl}$
- (b)  $\text{CsCl} > \text{KCl} > \text{NaCl} > \text{LiCl}$
- (c)  $\text{NaCl} > \text{KCl} > \text{LiCl} > \text{CsCl}$
- (d)  $\text{KCl} > \text{CsCl} > \text{NaCl} > \text{LiCl}$

**Answer:** (a)  $\text{LiCl} > \text{KCl} > \text{NaCl} > \text{CsCl}$

**Q4.** Why does sodium metal exhibit metallic lustre?

- (a) Diffusion of sodium ions
- (b) Oscillation of loose electrons
- (c) Excitation of free electrons
- (d) Existence of body-centred cubic lattice

**Answer:** (b) Sodium metal exhibits metallic lustre due to oscillation of loose electrons.

**Q5.** What will not happen if a moderate amount of sodium metal is dissolved in liquid ammonia at a low temperature?

- (a) Liquid ammonia will become diamagnetic
- (b) Liquid ammonia will become a good conductor of electricity
- (c) Sodium ions will form in the solution
- (d) None of the above

**Answer:** (a) Liquid ammonia will not become diamagnetic if a moderate amount of sodium metal is dissolved in liquid ammonia at a low temperature.

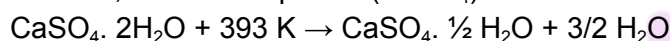
**Q6.** Why do beryllium and magnesium not give a characteristic colour to the flame, unlike other alkaline earth metals?

**Answer:** Compared to other alkaline earth metals, Beryllium and magnesium atoms are comparatively smaller, and their ionisation enthalpies are very high. Hence, the flame's energy is insufficient to excite its electrons to higher energy levels. These elements, therefore, do not give any colour to Bunsen flame.

**Q7.** What is the formula of gypsum? What happens when it is heated?

**Answer:**  $\text{CaSO}_4 \cdot 2\text{H}_2\text{O}$  is the formula of gypsum.

Plaster of Paris ( $\text{CaSO}_4 \cdot \frac{1}{2} \text{H}_2\text{O}$ ) is formed when gypsum ( $\text{CaSO}_4 \cdot 2\text{H}_2\text{O}$ ) is heated at 393 K. In contrast, dead burnt plaster ( $\text{CaSO}_4$ ) is formed when gypsum ( $\text{CaSO}_4 \cdot 2\text{H}_2\text{O}$ ) is heated at 473 K.



**Q8.** Why can we not synthesise alkali and alkaline earth metals using chemical reduction?

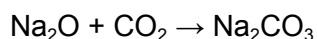
**Answer:** We can not synthesise alkali and alkaline earth metals using chemical reduction because they are strong reducing agents and, therefore, can not be reduced.

**Q9.** Why do group 1 metals not exist in a free state?

**Answer:** Group 1 metals are not found in a free state because they are highly reactive and therefore are not found free in nature. They are found in the combined state in the form of halide, oxide, silicates, borates, nitrates etc.

**Q10.** What happens when sodium oxide reacts with carbon dioxide? Write the balanced chemical equation for the reaction.

**Answer:** Sodium oxide reacts with carbon dioxide to form sodium carbonate.



**Q11.** Answer the following questions.

(a) Name the alkali metal that forms superoxide when heated in excess air.

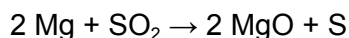
(b) Name the metal that floats on the water without any apparent reaction.

**Answer:** (a) Potassium, rubidium and caesium are alkali metals that form superoxide when heated in excess air.

(b) Lithium floats on the water without any apparent reaction.

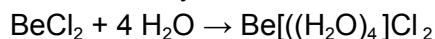
**Q12.** Why does a piece of magnesium continue to burn in the presence of sulphur dioxide?

**Answer:** A piece of magnesium continues to burn in the presence of sulphur dioxide because it reacts with sulphur dioxide to form magnesium oxide and sulphur.



**Q13.** Why can beryllium chloride be easily hydrolysed?

**Answer:** Beryllium chloride can be easily hydrolysed as it is electron deficient.



**Q14.** Answer the following questions.

(a) Arrange the following carbonates of alkaline earth metal in the decreasing order of thermal stability.

$\text{SrCO}_3$ ,  $\text{BaCO}_3$ ,  $\text{CaCO}_3$ ,  $\text{BeCO}_3$ ,  $\text{MgCO}_3$ .

(b) Arrange the following sulphates of alkaline earth metals in the decreasing order of thermal stability.

$\text{SrSO}_4$ ,  $\text{BeSO}_4$ ,  $\text{MgSO}_4$ ,  $\text{CaSO}_4$

**Answer:** (a) The decreasing order of alkaline earth metal carbonate thermal stability is  $\text{BaCO}_3 > \text{SrCO}_3 > \text{CaCO}_3 > \text{MgCO}_3 > \text{BeCO}_3$ .

(b) The decreasing order of alkaline earth metal sulphate thermal stability is  $\text{SrSO}_4 > \text{CaSO}_4 > \text{MgSO}_4 > \text{BeSO}_4$ .

**Q15.** Which of the following has the highest solubility each of the following?

(a)  $\text{BaSO}_4$ ,  $\text{CaSO}_4$ ,  $\text{MgSO}_4$ .

(b)  $\text{Mg}(\text{OH})_2$ ,  $\text{Ba}(\text{OH})_2$ ,  $\text{Ca}(\text{OH})_2$ .

**Answer:** (a)  $\text{MgSO}_4$  has the highest solubility.

(b)  $\text{Ba}(\text{OH})_2$  has the highest solubility.

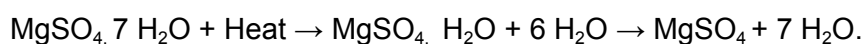
**Q16.** Why can we not prepare alkali and alkaline earth metals from chemical reduction?

**Answer:** We can not prepare alkali and alkaline earth metals from chemical reduction because they are strong reducing agents and, therefore, can not be reduced.

**Q17.** What is Epsom salt? What is the action of heat on it?

**Answer:** Epsom salt is hepta hydrated magnesium sulphate  $\text{MgSO}_4 \cdot 7 \text{H}_2\text{O}$ .

**The action of Heat:**



**Q18.** Why is it difficult to extract alkali metal by usual methods?

**Answer:** Alkali metals cannot be extracted from their ores by the usual methods of extraction of metals because of the following difficulties.

1. Alkali metals are strong reducing agents and hence cannot be extracted by reduction of their oxides or chlorides.

2. Alkali metals being highly electropositive, cannot be displaced from the aqueous solution of their salts by other metals.

3. Alkali metals cannot be isolated by electrolysis of the aqueous solution of their salts since hydrogen is liberated at the cathode instead of the alkali metal because the standard electrode potentials of alkali metals are much lower than that of water. By using mercury as a cathode, the alkali metals can be

deposited at the cathode. Still, the alkali metals so deposited readily combines with mercury to form an amalgam from which its recovery is very difficult.

**Q19.** What is the similarity between lithium and magnesium?

**Answer:** The similarity between lithium and magnesium are mentioned below.

1. The electronegativities of lithium and magnesium are nearly identical.
2. Lithium and Magnesium are both covalent.
3. Lithium has a boiling point of 1603 K, comparable to magnesium, i.e. 1373 K.
4. Hydroxides of lithium and magnesium are weak bases that readily break down when heated.  
 $2 \text{LiOH} \rightarrow \text{Li}_2\text{O} + \text{H}_2\text{O}$   
 $\text{Mg(OH)}_2 \rightarrow \text{MgO} + \text{H}_2\text{O}$
5. Aqueous hydrates of lithium chloride and magnesium chloride crystallise after they deliquesce.
6. Lithium and magnesium chloride are covalent and soluble in ethanol.
7. Lithium and magnesium ions have a high degree of hydration.
8. Lithium and magnesium hydroxide, carbonate, phosphate, and fluoride are sparingly soluble in water.
9. Lithium and magnesium do not form solid bicarbonates.
10. Lithium and magnesium perchlorate is soluble in ethanol.

**Q20.** List properties of lithium that differ from the rest of the family members.

**Answer: Properties of lithium that differ from the rest of the family members**

1. Lithium is harder than other alkali metals.
2. Lithium's melting and boiling point is higher than other alkali metals.
3. Lithium is the least reactive metal of all the other alkali metals.
4. Lithium is a strong reducing agent compared to other alkali metals.
5. Lithium is the only alkali metal that forms lithium monoxide.
6. Lithium cannot form solid hydrogen carbonates compared to other alkali metals.
7. Lithium does not react with ethyne to form ethynide. On the other hand, all other alkali metals form ethynide.
8. Lithium reacts slowly with bromine as compared to other alkali metals.