

## SCIENCE

### METALS AND NON-METALS

Answer the following questions

34. Give an account of important characteristics of Electrovalent/Ionic compounds.

Ans:- (.....Contd)

2) **Ionic compounds are solids:** Because of strong electrostatic attractions between ions, these are solids and relatively hard. But these compounds are generally brittle and break into pieces when pressure is applied.

3) Due to the powerful electrostatic force between the ions in a crystal of an ionic or electrovalent compound, considerable energy is needed to overcome these forces and breakdown the crystalline lattice, hence these compounds possess high melting points and boiling Points

4) **Ionic compounds are generally soluble in water:** Polar solvents like water weaken the interionic attractions and break the lattice. Therefore, ions are dispersed and dissolve in water and insoluble in non-polar solvents like kerosene, acetone, petrol, etc.

5) **Ionic compounds conduct electricity in molten state or when dissolved in water:** When an electrovalent compound is melted or dissolved in water, the binding forces in the crystal disappear and the component ions become mobile and they conduct electricity.

35. Compare the conductivity property of metals with the conductivity of ionic compounds.

Ans:- Ionic compounds do not conduct electricity in solid State whereas metals do. The conductance through metals is due to movement of valence electrons. Since movement of ions in ionic solids is not possible due to rigid structure, ionic compounds in the solid state do not conduct electricity. However, in the molten state or in aqueous solution, ionic compounds have free movement of ions and thus conduct electricity.

36. Write a note on the 'solubility' of ionic compounds.

Ans:- Ionic compounds are generally soluble in polar solvents like water because molecules of the polar solvents strongly interact with the ions of the crystal and the solvation energy so released is sufficient to overcome the attraction between the ions in the crystal lattice.

Non-polar solvents like benzene and carbon tetrachloride do not solvate the ions as their dielectric constant is low and thus these do not dissolve ionic compounds.

Ionic compounds like sulphate and phosphates of barium and strontium are insoluble in water. This can be attributed to the high lattice energies of these compounds due to polyvalent nature (high charges) of both the cations and anions. In these cases solvation energy is not sufficient to break the crystal lattice in these compounds.

37. What type of elements have maximum tendency to form cations?

Ans:- Electropositive elements, for example-alkali metals have maximum tendency to form cations. These have one electron in the outermost orbit and thus have comparatively low ionization energy

38. a) Name the solvent in which ionic compounds are generally soluble.

b) Why are aqueous solution of ionic compounds able to conduct electricity?

Ans:- a) Water.

b) Aqueous solutions of ionic compounds contain ions which help to conduct electricity.

39. Which of the following statement is true about ionic compounds?

i) They have bonds which are directional.

ii) They conduct electricity only in molten state.

iii) They conduct electricity in solid state.

iv) They conduct electricity in molten state as well as in aqueous solution.

Ans:- iv) They conduct electricity in molten state as well as in aqueous solution.

40. An atom A requires an electron to complete its octet. Atom B must release one electron while atom C must release 3 electrons to attain stable electronic configuration. Will electrovalent bond formation be favoured between A and B or between A and C? Why?

Ans:- Electrovalent bond formation will be favoured between A and B because release of one electron from B requires less energy than that required for release of three electrons from C.

41. An electrovalent bond will be formed from a combination of:

i) a metal and a non-metal

ii) two metals

iii) two non-metals

iv) two electropositive atoms

v) an electropositive and an electronegative atom

vi) two electronegative atoms.

Ans:- i) a metal and a non-metal.

v) an electropositive and an electronegative atom.

42. A molten salt which conducts electricity does not do so on solidification. Explain.

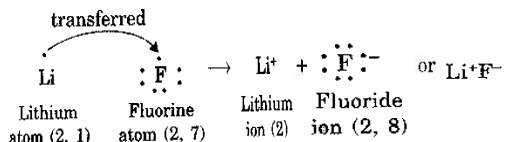
Ans:- The given salt is an electrovalent compound. In such type of salts, in molten state ions become mobile and conduct electricity whereas in solid form, ions are fixed in a lattice and thus the salt does not conduct electricity.

43. State the characteristics of elements that form ionic compounds.

Ans:- For the formation of an ionic bond, an atom must lose electrons and the other atom should accept electrons. The elements which can lose elements easily are called highly electropositive elements and those accepting electrons are called highly electronegative elements. The elements (Na, Mg, Al, etc.) having 1, 2, or 3 electrons in the outermost shells have a tendency to lose electrons to elements (O, F, Cl etc.), having 6 or 7 electrons in their outermost shell.

44. Give an account of the formation of lithium fluoride from its atoms.

Ans:- A lithium atom can lose one electron easily to form positive lithium ion and a fluoride atom can accept the electron released by lithium atom to form negative fluoride ion. Both the lithium ion and fluoride ion achieve noble gas configuration in this way and attract each other to form lithium fluoride. The total energy of the molecule is less than the sum of the energy of individual atoms involved.



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