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Classification Of Inorganic Substances and Their Types

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Annotation: In chemistry, an inorganic compound is typically a chemical compound that lacks carbon–hydrogen bonds, that is, a compound that is not an organic compound. However, the distinction is not clearly defined; authorities have differing views on the subject. The study of inorganic compounds is a subfield of chemistry known as inorganic chemistry.

Key words: Inorganic, amphoteric, oxide, salt-forming, oxidation, composition consists, Simple substances are divided into two groups: metals and nonmetals, metals and nonmetals.

Introduction

Inorganic substances are divided into two: simple substances and complex substances:

Substances whose composition consists only of atoms of the same element are called simple substances. As an example of simple substances all the elements in the table can be obtained. For example: K, Na, Al, H2, O2, O3, N2, S8, P4, C(graphite, diamond) and so on. By the composition of simple substances can be one atom (He, Ne, Xe, Kr), multi-atom (H2, N2, O2, O3, P4, S8).

Simple substances are divided into two groups: metals and nonmetals. In order to distinguish between metal, it is necessary to transfer from element B to element at 85. Metals are found in additional groups below the diagonal and above the diagonal.

Non-Metal are gaseous in the usual state (N2, O2, H2, F2, Cl2 and inert gases), liquid (Br2) and solid case (all remaining Non-Metal). Non-Metal form molecular or atomic crystal lattice without solids.

Metals are solid substances under normal conditions (except Mercury). They have a metal crystal lattice.

The property of an element to form several simple substances is called allotropy. The reason for the phenomenon of allotropy is that the number of atoms in the composition of a simple substance molecule is different, or the crystal structure of the substance is different.

For example: O2 and O3 enter into allotropic form changes. They differ from each other in the number of atoms and the structure. Uglerod has several different allotropic form changes. Uglerod formed a chain with a spatial structure (tetraedric) in the diamond position (sp3giridled). Uglerod is located on the floor-floor in graphite mode.Each uglerod atom is connected by an army of three atoms. Uglerod is connected using simple or double bonds in karbin position.

The composition of the molecule of complex substances is made up of atoms of different elements. For example, KOH, H2SO4, H2O, HCl, Al2O3 and others.

All complex substances are mainly divided into four classes: oxides, acids, bases and salts.

1. Oxides

Complex substances consisting of atoms of two elements, one of which is oxygen, are called oxides.

The general formula of oxides. When naming oxides, the name of the chemical element is called valence and oxide in a small bracket. Cu2O-copper(I) oxide, CuO Copper (II) oxide, BaO Barium Oxide, Mn2O7 manganese (YII) oxide.

Oxides are divided into four types: basic, acidic, amphoteric and neutral, or oxides that do not form salt. Also in the composition there are other compounds that hold oxygen. These include peroxide and mixed oxides. For example, Na2O2 , K2O2 and Mn3O4, Pb3O4.

Essential oxides. The oxides that the bases correspond to are called base oxides. Only metals form base oxides.

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$Li_2O \rightarrow LiOH; Na_2O \rightarrow NaOH; K_2O \rightarrow KOH;$

$Rb_2O \rightarrow RbOH; Cs_2O \rightarrow CsOH; CaO \rightarrow Ca(OH)_2;$

$BaO \rightarrow Ba(OH)_2; FeO \rightarrow Fe(OH)_2; MgO \rightarrow Mg(OH)_2$

$CrO \rightarrow Cr(OH)_2; MnO \rightarrow Mn(OH)_2; Mn_2O_3 \rightarrow Mn(OH)_3$

Results And Discussions

Oxides of BeO, CuO, CrO and MnO and many other metals do not interact with water. The hydroxides of such metals are obtained by indirect methods, that is, salts are subjected to strong bases.

$2Cu + O_2 = 2CuO; 2Mg + O_2 = 2MgO; Ca + O_2 = 2CaO$

Chemical properties. Essential oxides are solid substances. Some of them are well soluble in water.

The bases are formed when the oxides of the metals of the main group elements Iva II group interact with water except Beo and MgO. The oxides of metals in the remaining groups are not affected by water:

$K_2O + H_2O = 2KOH; Cs_2O + H_2O = 2CsOH;$

$CaO + H_2O = Ca(OH)_2; BaO + H_2O = Ba(OH)_2;$

They form salts that interact with acidic oxides:

$CaO + CO_2 = CaCO_3; CuO + SO_3 = CuSO_4;$

$3MgO + P_2O_5 = Mg_3(PO_4)_2$

Essential oxides interact with acids and form salt and water:

$CuO + H_2SO_4 = CuSO_4 + H_2O;$

$MgO + 2HNO_3 = Mg(NO_3)_2 + H_2O$

Acidic oxides. The corresponding oxides of acids are called acidic oxides. Acidic oxides are oxides of Non-metal and high-valence oxides of some metals, for example: CrO3; Mn2O7; MnO3; V2O5; MoO3; WO3).They are also referred to as anodes (dehydrated acids).

$SO_2 \rightarrow H_2SO_3; SO_3 \rightarrow H_2SO_4; N_2O_3 \rightarrow HNO_2;$

$N_2O_5 \rightarrow HNO_3; P_2O_3 \rightarrow H_3PO_3; P_2O_5 \rightarrow H_3PO_4;$

$Cl_2O_7 \rightarrow HClO_4; Mn_2O_7 \rightarrow HMnO_4; SiO_2 \rightarrow H_2SiO_3$

Each acidic oxide corresponds to acid:

Base oxides are formed by direct oxygen exposure to metals: The names of the bases are given as follows: "hydroxide", then the Russian name of the metal in the genitive case, and in Roman numerals in parentheses - the state of oxidation, if it is variable. For example: KOH - potassium hydroxide, Ni (OH) 2 - nickel (II) hydroxide. SiO_3 is a three acidic base).

Under normal conditions, the bases are solids, with the exception of ammonium hydroxide - an aqueous solution of NH_4OH ammonia (NH_4^+ - ammonium ion, which is part of the ammonium salt).

Classification of bases

Depending on the relationship to water, the bases are divided into soluble (alkaline) and insoluble, Ba (OH) $_2$, Ra (OH) $_2$) as well as aqueous ammonia solution. All other bases are almost insoluble in water.
Inorganic chemistry deals with the behaviour and synthesis of inorganic and organometallic compounds. The field of inorganic chemistry covers chemical compounds that are not carbon-based. Inorganic chemistry has applications in many of the chemical industry, like catalysis, materials science, pigments, surfactants, coatings, medications, fuels, and agriculture.

In simple language, inorganic chemistry is opposite to that of Organic Chemistry. The substances which do not have carbon-hydrogen bonding are metals, salts, substances, etc.

On this planet, there exist about 100,000 inorganic compounds. Inorganic chemistry is the study of the behavior of compounds along with their properties, their physical and chemical characteristics. The elements of the periodic table except for carbon and hydrogen are in the lists of inorganic compounds. Many of the elements very important like titanium, iron, nickel and copper. The transition metals form useful alloys, with each other and with other metallic elements.

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Classification of Inorganic Compounds

The organic compounds that are classified under Inorganic chemistry are:

- **Acids:** Acids are compounds that dissolve in water and generate hydrogen ions H+. For example, hydrochloric acid, citric acid, sulphuric acid, vinegar, etc. One example of the acidic reaction is: $HCl+H2O \rightarrow H^+ + Cl^-$
- **Bases:** A base is a compound that produces hydroxyl ions when kept in water. For example, potassium hydroxide, calcium hydroxide, ammonia, sodium hydroxide produces OH^- ions when dissolved in water. $KOH+H2O \rightarrow K^+ + OH^-$
- **Salts:** Salt is a substance obtained as a result of the reaction between an acid and a base. The table salt of sodium hydroxide is one of the common examples of salts.
- **Oxides:** Oxides are compounds that consist of one oxygen atom.

Topics Related to Inorganic Chemistry

Organometallic Chemistry

Organometallic Chemistry is an interdisciplinary science. It has grown at a pace during the last three to four decades. Organometallic compounds are in use as homogeneous catalysis agents in industries.

Organometallic chemistry is the study of an organometallic compound. Many compounds without these bonds are chemically identical, an alternative may be compounds containing metallic bonds of a covalent nature. It blends elements of inorganic chemistry with organic chemistry.

Transition Elements

A transition element is partially filled with d-orbitals in its penultimate shell. These elements are useful as it enables us to recognize a transition element by its electronic configuration. This excludes zinc, cadmium and mercury from the transition elements as they do not have a partially filled d-orbital. They are considered transition elements as their properties are an extension of the properties of transition elements chemistry.

Coordination Chemistry

Coordination compounds had applications long before the establishment of inorganic chemistry. An investigation of structure and bonding in coordination chemistry started with the inquisitiveness of Tassaert.

P-Block Elements

The elements placed in group 13 to group 18 constitute the p-block. The properties of p block elements are greatly influenced by their atomic size, ionization enthalpy, electron gain enthalpy and electronegativity. The absence of d–orbitals in the second period and the presence of d- or f-orbitals in heavier elements has an effect on the properties.

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