

Classification of Chemicals

Before learning how chemicals are named, it is important to understand how they are classified. Classification is the process of grouping chemical substances based on their composition, structure, properties, or origin. Since millions of chemical compounds are known today, classifying them into different categories makes their study more organized and systematic. It also helps scientists, researchers, and industries select suitable chemicals for specific applications.

From an industrial and academic point of view, chemicals are broadly classified into two major groups: **organic chemicals** and **inorganic chemicals**. This classification forms the basis for studying chemical nomenclature because each group follows its own naming rules and conventions.

Organic Chemicals

Organic chemicals are compounds that contain carbon as their principal element, usually bonded with hydrogen and often with oxygen, nitrogen, sulfur, phosphorus, or halogens. The majority of compounds found in living organisms belong to this category, although many organic compounds are also synthesized artificially in laboratories and industries.

Organic compounds exhibit a wide variety of structures and properties because carbon atoms can form long chains, branched chains, and ring structures through strong covalent bonds. This ability allows the formation of millions of different compounds with unique physical and chemical characteristics.

Organic chemicals play a vital role in everyday life. They are used in the manufacture of medicines, plastics, synthetic fibres, dyes, detergents, cosmetics, fuels, pesticides, food additives, paints, adhesives, and numerous other industrial products. Because of their enormous diversity, organic compounds follow detailed IUPAC rules for systematic naming.

Examples of Organic Chemicals

Compound	Chemical Formula	Common Application
Methane	CH ₄	Fuel
Ethanol	C ₂ H ₅ OH	Solvent and sanitizer
Acetic acid	CH ₃ COOH	Vinegar and chemical industry
Glucose	C ₆ H ₁₂ O ₆	Energy source in living organisms

Inorganic Chemicals

Inorganic chemicals are compounds that generally do not contain carbon-hydrogen (C-H) bonds. They include metals, minerals, salts, acids, bases, oxides, and many other compounds that are widely used

in chemical industries. Although some carbon-containing compounds such as carbon dioxide, carbon monoxide, carbonates, bicarbonates, and cyanides are classified as inorganic compounds, they do not belong to the organic group because they lack characteristic carbon-hydrogen bonding.

Inorganic chemicals are essential raw materials for numerous industrial processes. They are used in fertilizer production, metallurgy, ceramics, cement manufacturing, water treatment, batteries, pigments, pharmaceuticals, electronics, and many other sectors.

Examples of Inorganic Chemicals

Compound	Chemical Formula	Common Application
Sodium chloride	NaCl	Food and chemical industry
Sulfuric acid	H ₂ SO ₄	Fertilizer manufacture
Sodium hydroxide	NaOH	Soap and paper industries
Calcium carbonate	CaCO ₃	Cement and construction

Difference Between Organic and Inorganic Chemicals

Organic Chemicals	Inorganic Chemicals
Contain carbon bonded with hydrogen.	Generally do not contain carbon-hydrogen bonds.
Mainly form covalent compounds.	Often form ionic compounds.
Usually have lower melting and boiling points.	Generally have higher melting and boiling points.
Commonly combustible.	Usually non-combustible.
Examples: Ethanol, methane, benzene.	Examples: NaCl, HCl, NaOH, CaCO ₃ .

Key Point:

The classification of chemicals into organic and inorganic compounds provides the foundation for understanding chemical nomenclature. Since the structure and composition of these compounds differ significantly, separate naming rules have been developed for each category.

Now that the major classes of chemicals have been introduced, the next section explains the **IUPAC nomenclature of organic compounds**, where the systematic rules for naming hydrocarbons and their derivatives are discussed in detail.