Editorial

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Crystallography its Types and Properties

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Introduction

Crystal Structure is nothing but the geometry of arrangement of particles within the unit of a molecule. It studies the structure, properties and formation of the crytsals. It is used to determine the position of atoms in the solid structure of a molecule. There are four types of crystals like covalent, ionic, metallic, and molecular. Every crystal has a different type of bond between its atoms. A unit in the crystal will have a complete symmetry of the whole crystal. So, it is recommended to study the symmetry of a single unit in a crystal rather than the entire one. They have the lengths of the cells taken as a,b,c and the angles denoted by α,β,γ and the positions are described by the coordinates denoted by x,y,z.

Covalent crystals are those crystals whose atoms are joined with a covalent bond. These connections are usually very strong and hard to destroy and hence have high melting points. Ionic crystals are those whose atoms are connected through an ionic bond. These crystals have a high melting point. Metallic crystals are those that are connected through metallic bonds. These are good conductors of electricity. Their melting point depends on the metal used in the crystal. Molecular crystals are those that are connected through hydrogen bonds. They have a very low melting point.

Crystals are mostly said to promote good health, promote healing and get rid of negative thoughts to get emotional benefits. They were once considered as the medicine to many problems. One such example of the powerful crystal on earth is the diamond. Other crystals that are present in the nature are amber, amethyst, ametrine, ammonite, angelite, apatite, apophyllite, azurite, azurite malachite, black shiva lingam, calcite, charoite, chrysocolla, cinnabar, citrine, clear quartz, danburite, dendritic quartz, emerald, fluorite, garnet, hematite, Herkimer diamond, jade, jet, kyanite, labradorite, lepidolite, malachite, moldavite, morganite, onyx, rose quartz, ruby, selenite, smoky quartz, sunstone, turquoise etc.

Crystals exhibits both physical and chemical properties. Some of the physical properties of Crystals are hardness, heat conductivity, electrical conductivity, optical properties. They are sharp and have defined melting points because all the molecules or atoms are relatively in the same distance from one another. These properties also define in which industry the crystal mostly fits in. For instance, the crystals with high electrical conductivity are mostly used in communication industry. Another property of the crystal is the anisotropic but not all the crystals are anisotropic. They are exhibited by the crystalline solids.

In crystallography, lattice system means one of the several classes of crystals. If two crystals have same symmetry then they are in the same crystal system even though they may have a lot of exceptions. Crystal systems and lattice systems are mostly similar but have slight differences. A lattice system is a group of lattices with similar lattice points but in a crystal group there are both lattices and point groups. A group of two lattice points makes a single system. There are hence seven lattice systems such as triclinic, monoclinic, orthorhombic, tetragonal, rhombohedral, hexagonal and cubic.