

MINERALS IN INDIA

Types and Occurrence of Minerals

Minerals are defined as naturally occurring homogeneous substances that have a definite internal structure. Some minerals are essential for our body to carry out its chemical and biological processes. A rock may contain one or several types of minerals mixed with organic material.

A geographer studies about the distribution and economic importance of a mineral while, a geologist studies the formation, age and composition of minerals. The properties of a mineral depend on the elements it is made of, and the chemical and physical conditions in which it was formed.

Minerals are classified as metallic minerals, non-metallic minerals and energy or fuel minerals. The metallic minerals can be further classified as ferrous minerals, or the ones that contain iron, non-ferrous minerals and precious metals, like gold, silver and platinum.

Minerals occur in the earth's crust as:

- . Veins and lodes in igneous and metamorphic rocks
- . Beds or layers in sedimentary rocks
- . Alluvial or placer deposits on valley floors
- . Residual mass after weathering of surrounding rocks

Some metallic minerals, like gold, silver, platinum and tin, are found as alluvial deposits in the sand and soil in valleys. Such alluvial deposits are also called placer deposits. Around 70% of the surface

of the earth is covered by water. The water of the seas and oceans, and the ocean floors, also have rich mineral deposits.

India has rich mineral resources in some parts of its territory. To be an ore, a mineral should:

- . Be abundantly available
- . Offer sufficient concentration of an element
- . Have a commercially viable process of extraction

The places from where mineral ores are extracted are called mines. All the mineral reserves in India are owned by the government. In Meghalaya, families lay claim to coal deposits, and mine coal by digging long narrow tunnels in the ground. This practice is called rat hole mining.

Distribution of Minerals

Rocks are mainly of three types -igneous, sedimentary and metamorphic. Different types of rocks contain different types of minerals. Metallic minerals are mostly found in igneous and metamorphic rocks like copper, nickel, platinum, chromites, and iron.

Rocks appear different in colour due to the minerals present in them like the Uluru commonly known as the Ayers Rock in Western Australia is also known to change colour everyday and in every season. Depending on the light falling on it, it changes colours ranging from blue to violet to glowing red.

Non-metallic minerals like limestone and phosphate, and metallic minerals like manganese can be found in sedimentary

rocks. Mineral fuels like coal and petroleum are also found in sedimentary rocks.

Asia produces more than half of the world's tin. China, Malaysia and Indonesia are among the world's leading producers of tin. Brazil and Bolivia are among the world's largest producers of tin.

Europe is the leading producer of iron ore in the world. India and China also have large deposits of iron ore. Brazil is the largest producer of high-grade iron ore in the world.

Chile and Peru are the leading producers of copper. South America also has large deposits of gold, silver, zinc, chromium, manganese, bauxite, mica, platinum, asbestos and diamond. Africa is world's largest producer of diamonds, gold, and platinum. South Africa, Zimbabwe and

Zaire produce a large portion of the world's gold.

Australia is the largest producer of bauxite in the world. It is also the leading producer of gold, diamond, iron ore, tin and nickel.

There is just one country, Switzerland that has no known mineral deposit in it. India has deposits of high grade iron ore. India is the largest producer of mica in the world. Kolar in Karnataka has deposits of gold. These are one of the deepest mines in the world, and hence the mining of this ore is expensive.

India is one of the leading producers and exporters of salt.

Ferrous and Non-Ferrous Minerals

Ferrous minerals contain iron, non-ferrous minerals do not contain iron. Ferrous minerals constitute about 75% of the total production of minerals in India. India exports substantial amounts of ferrous minerals.

Iron ore and manganese are two important ferrous minerals mined in India. The two main ores of iron are magnetite and hematite. Magnetite has up to 70% iron, while hematite has 50-60% iron.

Karnataka and Orissa are the main iron ore producing states in India, followed by Chhattisgarh, Goa and Jharkhand. Major iron ore producing belts of India, are: the Orissa-Jharkhand belt, the Durg-Bastar-Chandrapur belt, the Bellary-Chitradurga-Chikmagalur-Tumkur belt and the Maharashtra-Goa belt.

High-grade hematite is mined in the Badampahar mines in Mayurbhanj and Kendujhar districts of Orissa. The Durg-Bastar-Chandrapur belt is spread over parts of Chhattisgarh and Maharashtra. These hills contain 14 deposits of hematite.

The Bellary-Chitradurga-Chikmagalur-Tumkur belt lies in Karnataka. The Kudermukh mines in this region hold one of the largest deposits of iron ore in the world. Orissa is the main manganese-producing state in India, followed by Madhya Pradesh and Karnataka.

The Maharashtra-Goa belt is spread over parts of Goa and Ratnagiri district of Maharashtra. Steel is a mixture of several minerals besides iron ore, and one such important mineral is manganese. The reserves of non-ferrous minerals in India are not as abundant as those of ferrous

minerals. Copper and bauxite are two important non-ferrous minerals mined in India. Copper is widely used in the electrical, electronic and chemical industries.

Madhya Pradesh, Rajasthan and Jharkhand are the main copper-producing states in India. Aluminium is a strong, yet light-weight metal derived from a non-ferrous mineral. Bauxite is the main ore of aluminium. Orissa is the main bauxite-producing state in India, followed by Gujarat, Jharkhand and Maharashtra.

Use and Conservation of Minerals

Mineral resources can be found in almost every aspect of our lives. Granite is widely used as building stone is one of the hardest rocks found in nature. It is made up of three minerals - quartz, feldspar and

mica. Gypsum is used in plaster cast which is used on broken arms or legs.

The lead in your pencil is made from graphite while crayons and paints are made from talc.

The fireworks are made from yellow-coloured mineral called sulphur, also used for making matches and explosives, sulphuric acid, fertilizers, chemicals and dyestuff.

Copper is a good conductor of heat and electricity obtained from metallic mineral called chalcopyrite or copper pyrite. It so flexible that it can be rolled into flat sheets, wires and other shapes. Hence, copper is used extensively in various electrical appliances. It is also used to make electrical cables and wires, switches, coins, cooking utensils and water pipes. Copper is also used in plumbing, heating, roofing and construction.

Iron is another very important metal that is obtained from minerals such as limonite, hematite and magnetite. These minerals are called iron ores. Iron is mainly used to manufacture steel. Iron and steel are used in almost all industries for manufacturing ships, airplanes, cars, cycles, trucks and vans.

They are widely used in the construction industry to make building support and structures. Iron is also used in the manufacture of computers, and office stationery like staples, nails and paper clips.

The mineral manganese is a key component in the production of iron and steel. Today, the technique devised by the Hittites is called smelting of iron.

Aluminium is another very important metal that is obtained from its ore bauxite. It is used in the manufacture of automobiles and airplanes, and building and electrical materials. It is also used in the bottling and canning industries; kitchen cookware and foil, and personal product like deodorants and cosmetics.

Gold and silver are rare metals that are popularly used to make jewellery. They are also used to make medallions and coins, and in dentistry and medicine.

Certain minerals, called gemstones, are also used to make jewellery. They are hard and come in many beautiful colours. Some gemstones, like diamonds, sapphires, emeralds and rubies, are rare and very expensive and are known as precious stones.

Some gemstones, like turquoise, garnet, amethyst, aquamarine, topaz, moonstone, peridot and opal, are not as rare and so are known as semi-precious stones.

Gemstones are first cut and polished, then set into precious metals like gold, silver and platinum to make artistic jewellery.

Diamond is the hardest mineral found on the earth and so is used for making cutting tools that are used for cutting other gemstones.

Minerals are also very essential for all living beings.

Iron is present in every living cell. It is very essential for the production of haemoglobin, which is the primary component of red blood cells. Other minerals like zinc, manganese, copper and fluoride are also required in very small

amounts in our diet.

Minerals are non-renewable resources. It is very important to control their use and conserve minerals for the future.

There are three ways of conserving minerals for future use – reduce, recycle, reuse.

You can reduce the amount of waste you create by choosing what rubbish you throw away. Recycling means to return a waste product to a place where it is remade into either the same product or something different. The reuse of metals will also help in reducing the rate of consumption, and help in the conservation of minerals.