Copper: environmental effects of copper and how copper is processed essay sample

Environment

Copper can be released into the environment by both natural sources and human actions. Examples of natural sources are wind-blown dust, decaying vegetation, forest fires and sea spray. Other examples are mining, metal production, wood production and phosphate fertilizer production.

Because copper is released both naturally and through human activity it is very widespread in the environment. Copper is often found near mines, industrial settings, landfills and waste disposals.

When copper ends up in soil it strongly attaches to organic matter and minerals. As a result it does not travel very far after release and it hardly ever enters groundwater. In surface water copper can travel great distances, either suspended on sludge particles or as free ions.

Copper does not break down in the environment and because of that it can gather in plants and animals when it is found in soils. On copper rich soils only a number of plants has a chance of survival. That is why there is not much plant diversity near copper disposing factories. Due to the effects upon plants copper is a serious threat to the productions of farmlands. Copper can also influence the proceedings of certain farmlands, depending upon the acidity of the soil and the presence of organic matter. Despite of this, copper-containing manures are still applied.

Copper can interrupt the activity in soils, and influences the activity plants and animals

When the soils of farmland are polluted with copper, animals will absorb concentrations that are damaging to their health. Mainly sheep suffer a great deal from copper poisoning.

Resource Processing

There are Four methods used to process copper, these methods are:

Milling

Smelting

Electrolytic refining

Final processing

Milling acts as a crusher, where the ore is broken into small pieces. Water is first added to the crushed ore to form a souplike mixture called slurry.

The slurry goes through a flotation process that concentrates the mineral-bearing particles, then rotates through a ball mill with iron balls. It then passes into tanks called flotation cells where chemicals and oil are added, and the mixture is agiated with air to make it bubble. The bubbles rise to the top of the cell wit the particles and form a froth which is skimmed and dried.

This process forms copper concentrate containing from 15 to 33% copper. The waste material, called tailings, does not become attactched to the bubbles. It is emptied from the lower part of the flotation cell and sent to storage ponds.

Smeling removes most of the remaining impurities from copper. During the smelting process, copper concentrate is dried, then blown with air and pure oxygen into a flash smelting furnace. In the furnace, the concentrate burns and melts, releasing some impurities in the form of sulphur dioxide gas. The molten material falls to the bottom of the furnace, where it serparates in to slag and copper matte. Slag, rises to the surface and is then discarded

In the next stage of the process, the molten matte goes through a converter. In the converter, blowers force air through, and then silica is added. The silica combines with the impurities, forming slag. The slag is skimmed from the top. The new mixture is called blister copper. Blister copper is from 97 to 99. 5% pure.

Copper must be electrolytically refined to a purity of more than 99. 9% to use electrical conductors. To do this, fire-refined copper is cast into cakes about 91 centimetres square and 5 centimetres thick. The cakes serve as anodes in the electrolytic process.

Finally, the copper anodes are put into tanks containing a solution of copper sulphate and sulphuric acid. They are suspended alternately with cathodes, which are thin sheets of pure copper. Most o the remaining impuritities in the anodes settle to the bottom of the tank and form a sludge. After electrolysis, the copper cathodes are usually melted in a furnace and cast into various shapes and sizes.