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Raw Material Resources

1.1

Primary Raw Materials [1]

The earth has an average copper content of approximately 0.006%¹⁾. Copper is the twenty-third most common element in the earth's crust [2]. There are traces of copper in almost all types of rock. Like iron, copper has the tendency to combine easily with sulfur and oxygen, which accounts for why both metals are often found together in ore as sulfurous minerals.

Copper is seldom found in metallic form, although there are examples in the Urals, at Lake Superior in the USA and in New Mexico. The most important copper ores are copper pyrite (chalcopyrite) and copper glance (chalcocite). Copper pyrite (CuFeS_2) contains 34% copper and copper glance (Cu_2S) 79%. Important ores in mining include sulfide mineral peacock ore (bornite) and the oxide minerals: malachite, blue malachite (azurite) and red copper ore (cuprite).

1.2

Availability

Copper ores are mined in underground and open pit mining. Figure 1 shows the main copper mining areas: in Africa, e.g. Zambia and the south, the west coast of South America, central and northern Chile, Peru, Mexico, the lakes area of North America, Canada, the south west of the USA and the former Soviet States: Russia, Kazakhstan and Uzbekistan. There are also significant deposits in Australia, China, Indonesia, Papua New Guinea and the Philippines. In Europe, the only deposits worth mentioning are in Portugal, Poland (Upper Silesia), Serbia and Bulgaria. Chile with 35.5% of mining output worldwide was the largest copper producer in 2005.

Known copper reserves are estimated at 940 million tonnes (2004), of which 470 million tonnes are commercially extractable under current conditions. Potentially usable reserves of copper are currently estimated at 1.6×10^9 tonnes. There are more reserves in maritime "manganese nodules", which are today not

1) Unless stated otherwise, these details refer to per cent by weight.

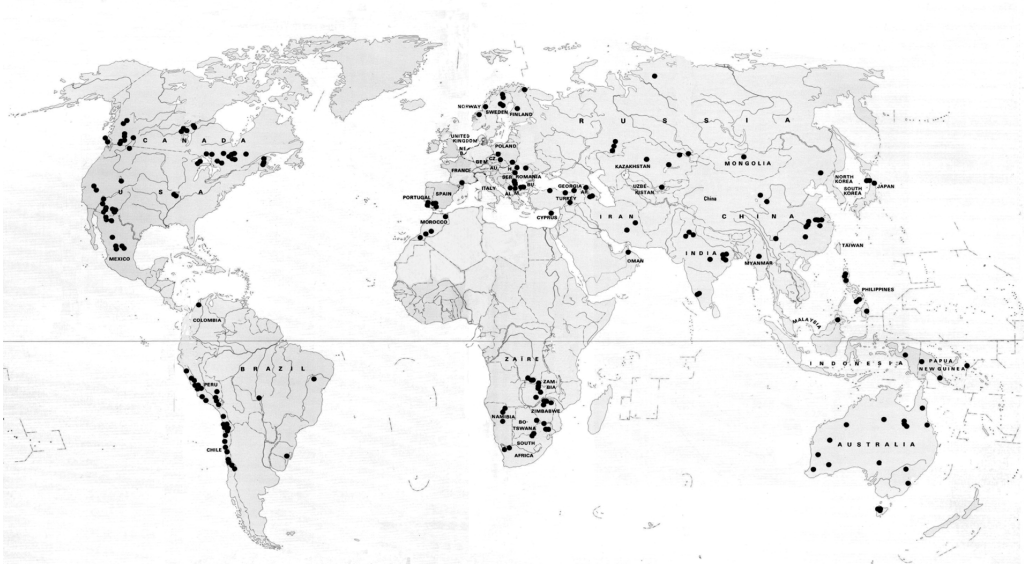


Fig. 1 Copper in the World [2]: The mining output of copper ore in 2003 produced around 14.4 million tonnes of copper [3 a]

commercially viable. The copper content of the manganese nodules alone is estimated at 0.7×10^9 tonnes [3]. Work is now being carried out on processes for commercial copper extraction from these deposits, which are low in metal or difficult to mine.

The supply of copper in the form of deposits and reserves has constantly increased over the years and is thus assured for the foreseeable future.