

Minerals: Vital Role in Human Health and Industry

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DESCRIPTION

Minerals are naturally occurring, inorganic substances with a definite chemical composition and a crystalline structure. They are fundamental to the health of both the planet and its inhabitants. From building infrastructure to enabling biological processes, minerals play a crucial role in a wide array of applications. The human body requires various minerals to function correctly. These essential minerals can be categorized into two groups: Macro minerals and trace minerals. Macro minerals, needed in larger amounts, include calcium, potassium, sodium, magnesium, phosphorus, and chloride. Trace minerals, required in smaller quantities, include iron, manganese, copper, iodine, zinc, fluoride, and selenium. Crucial for bone and teeth formation, muscle function, and nerve signaling. A deficiency can lead to osteoporosis and other bone disorders. Helps maintain normal fluid balance, nerve transmission, and muscle contractions. An imbalance can cause muscle weakness and irregular heartbeats. Vital for the production of hemoglobin, which transports oxygen in the blood. Iron deficiency leads to anemia, causing fatigue and weakness. Supports immune function, wound healing, DNA synthesis, and cell division. A lack of zinc can impair growth and the immune response. Minerals are obtained through a balanced diet, rich in fruits, vegetables, meats, and dairy products. However, deficiencies can occur due to poor dietary choices, certain medical conditions, or lifestyle factors, necessitating supplements. Beyond their biological significance, minerals are indispensable in various industries. They serve as raw materials for construction, manufacturing, technology, and energy production. Minerals such as sand, gravel, limestone, and gypsum are fundamental in building infrastructure. Limestone is used in cement production, while gypsum is a key component in drywall. Metals like iron, copper, and aluminum are extracted from minerals and are pivotal in producing machinery, vehicles,

and appliances. Iron ore is processed into steel, a cornerstone of modern industry. Rare earth elements, including neodymium and dysprosium, are essential for manufacturing high-tech devices like smartphones, computers, and renewable energy technologies. Supports immune function, wound healing, DNA synthesis, and cell division. A lack of zinc can impair growth and the immune response. Minerals are obtained through a balanced diet, rich in fruits, vegetables, meats, and dairy products. However, deficiencies can occur due to poor dietary choices, certain medical conditions, or lifestyle factors, necessitating supplements. Beyond their biological significance, minerals are indispensable in various industries. These minerals are critical for making permanent magnets used in electric motors and wind turbines. Fossil fuels such as coal, oil, and natural gas, derived from mineral deposits, have historically been the primary sources of energy. Additionally, uranium is a key mineral used in nuclear energy production. The extraction and processing of minerals significantly impact the environment and economy. Mining activities can lead to habitat destruction, water pollution, and soil erosion. Sustainable practices and regulations are essential to minimize these impacts. Recycling metals and using alternative materials can also reduce the environmental footprint. Economically, the mining industry provides jobs and stimulates local and national economies. It can bring prosperity to regions rich in mineral resources, though it can also lead to economic disparities and conflicts over resource control. Minerals are indispensable to human health, industrial development, and technological advancement.

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COMPETING INTEREST

The authors declare that they have no competing interests.

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