

## EDITORIAL

## Boron- Beneficiation, Utilization and Health Effect

Most of the boron minerals do not meet the specifications of the market in terms of grade and impurities; therefore, natural borates are generally cleaned from their impurities in processing plants. The methods used in the beneficiation of boron minerals are simple. Attrition scrubbing and washing are among the most widely used methods of cleaning. Gravity concentration, magnetic and electrostatic separation, flotation, calcination are the other methods of beneficiation. Flotation of boron minerals is not well developed. The association of borates with clay minerals which cause slime coating, adversely affect the flotation process. Besides, high ionic strength, high viscosity of the pulp and interaction of cations at the solid/liquid interface are the other sources of difficulties in flotation. In this special topic issue, the flotation chemistry and electrokinetic properties of boron minerals will be reviewed.

Human beings are naturally exposed to boron via by oral (food, drinking water, dietary supplements), inhalation of boron compounds (dust) and tissue (cosmetics, soaps, detergents) ways. Although, the safe limits of human daily boron exposure are not absolutely clear due to limited information, there is a growing interest confirming the safety and essentiality of the element in humans. On the other hand, boron determination in biological matrices needs sensitive techniques for detection in trace levels. The analytical techniques have greatly improved through the years with recent values reported more credible, reliable and accurate due to improvements in sample collection, storage, and digestion methodologies.

Boron which is found in cells as boric acid participates in important membrane and cellular functions associated with osteoporosis, arthritis and cancer. Its essentiality, dietary requirements, metabolic functions and important public policies are focused in the special issue.

One of the new applications is utilization of boron minerals or compounds as a binder in the agglomeration of iron ore fines. Bentonite is the most widely used binder, however, it is an impurity due to its high silica and alumina content. Boron compounds, free of silica and alumina, due to their low melting points and ability to lower the melting temperatures of silicates are found promising binder in iron ore pelletization. The limited number of researches are covered in this special issue.

Borates, both natural and synthesized, are important in high technology utilization areas. Boron compounds are good candidates for usage in personnel and medical radiation dosimetry. The radiation dosimetry which measures the amount of radiation that a person is exposed in nuclear stations and radiotherapy departments of hospitals, is one of the application areas. In order to be used in radiation dosimetry, the thermoluminescent material should have some necessary properties. Lithium borate compounds (e.i. lithium tetraborate and lithium triborate) are suitable materials for dosimetry due to their satisfactory thermoluminescence properties.

**Keywords:** Boron minerals and compounds, flotation, elektrokinetic properties, cervical cancer, anticarcinogenic agents, dietary boron, daily exposure, boron utilization.

**Subtopics:** Flotation of borates, Uses of boron compounds in dosimetry, Uses of boron as binder in pelletization, Health effect of boron.

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