



Colorado School of Mines Office for Technology Transfer

Synthesis of Boron Using Molten Salt Electorlysis

Dr. Patrick Taylor and Judith Gomez

Department of Metallurgical and Materials Engineering

Description: Boron is an element that is difficult to isolate in its pure form and requires a substantial amount of energy. Typically, boron is synthesized by metallothermic reduction of its oxide with magnesium or sodium; reaction of boron halogenides with hydrogen; or, thermal decomposition of diborane. An alternative method using molten salt electrolysis has been reported by Mines researchers. A mixture of $MgF_2 - NaF - LiF - B_2O_3$ salts was molten under an inert atmosphere, and the effect of different experimental parameters such as temperature, potential and current density were used to provide pure boron.

Potential Areas of Application

- Aerospace applications
- Solid-fuel propulsion
- Shielding for nuclear radiation
- Neutron sensors
- Cancer treatment

Main Advantages of this Invention

- Uses no metallic magnesium
- Boron recovered is at least as pure (in most cases purer) than current methods
- The process can be reinforced by the boronization of the steel cathodes

Intellectual Property Status: Provisional patent filed May 14, 2010

Patent ID: 12/780,382

Opportunity: We are seeking an exclusive or non-exclusive licensee for marketing, manufacturing, and sale of this technology.

Contact

William Vaughan
Director, Technology Transfer
Colorado School of Mines
1500 Illinois Street
Guggenheim Hall, Suite 314
Golden, CO 80401
303.384.2555
wvaughan@mines.edu