



Synthesis of Boron Using Molten Salt Electrolysis

Judith C. Gomez and Patrick R. Taylor

Summary: A method to produce elemental boron

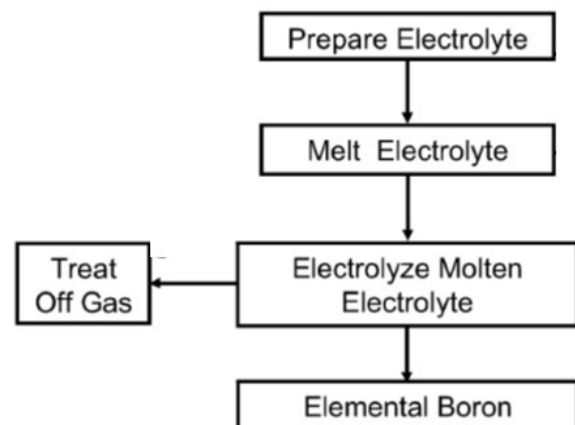
Description: Elemental boron is difficult and requires substantial amount of energy to isolate in its pure form. Typically, boron is synthesized by metallothermic reduction of its oxide with magnesium or sodium, reaction of boron halogenides with hydrogen, or thermal decomposition of diborane. This work presents a new method to produce elemental boron using molten salt electrolysis. The molten electrolyte has a boron-containing compound, at least one alkaline earth fluoride salt, and at least two alkali earth fluoride salts. Elemental boron is recovered by electrolyzing the molten electrolyte in the temperature range of 700 to 775°C. The recovered elemental boron has a purity of at least 50%.

Main Advantages of this Invention

- Uses no metallic magnesium
- The recovered boron is at least as pure or more pure than current methods
- The process can be reinforced by the boronization of the steel cathodes

Potential Areas of Application

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



ID Number: 9006

Intellectual Property Status: US 8,287,715

Opportunity: We are seeking an exclusive or non-exclusive licensee for implementation this technology.

For more information contact:

William Vaughan, Director of Technology Transfer

Colorado School of Mines, 1500 Illinois Street, Guggenheim Hall Suite 314, Golden, CO 80401

Phone: 303-384-2555; e-mail: wvaughan@mines.edu