

CHAPTER 5. BRUCITE

Brucite is a magnesium hydroxide with the chemical formula $Mg(OH)_2$. It is white to pale green, grey or blue, has a pearly lustre on cleavage surfaces, elsewhere it has a waxy to vitreous lustre. Brucite has a hardness of 2.5 on Mohs scale, a specific gravity of 2.39 and belongs to the hexagonal crystal system with perfect cleavage along (001). The mineral is found in three very distinct forms: the platy or foliate type; the fibrous material usually elongated on an *a* axis; and massive material with a soapy appearance (Berry and Mason, 1959). Brucite is infusible and glows before a blow pipe. It is easily soluble in hydrochloric acid.

Brucite is usually associated with calcite, aragonite, talc, magnesite and other more rare minerals and is typically a low temperature hydrothermal vein material. It commonly occurs in metamorphosed dolomitic limestones.

USES

Brucite is one of several minerals used as a source for magnesium metal. In 1986, 49% of magnesium metal was used in the manufacture of aluminum-based alloys. Magnesium castings and wrought products accounted for 20%; reducing agent, 10%; cathodic protection, 6%; manufacture of nodular cast iron, 2%; and other uses, 13% (Kramer, 1987). Aluminum alloys containing magnesium metal are used primarily in beverage cans and the automotive industry. In the automotive industry, applications make use of its high strength and light weight.

Developments in rapid solidification technology, high purity magnesium alloys with improved physical properties, and the continued penetration of magnesium into automotive applications indicated a potential to increase domestic magnesium consumption significantly. In addition, advances in aluminum can fabrication technology may result in the development of aluminum food cans which contain an average of 3.5% magnesium (Kramer, 1986b).

WORLD SUPPLY

Resources from which magnesium compounds may be recovered range from large to virtually unlimited and are globally widespread. Identified world resources of brucite are estimated to be several million tonnes (Kramer, 1987).

NOVA SCOTIA POTENTIAL

The brucite deposit with the best potential for development occurs near Meat Cove, Inverness County (Fig. 15). A brucite marble unit extends approximately 2.4 km across the property. The crystalline limestone lithologically resembles the Hadrynian George River Group carbonates found in southeastern Cape Breton Island and appears to be a remnant in the Devonian granite and syenite. This limestone remnant hosts the zinc, brucite and associated minerals.

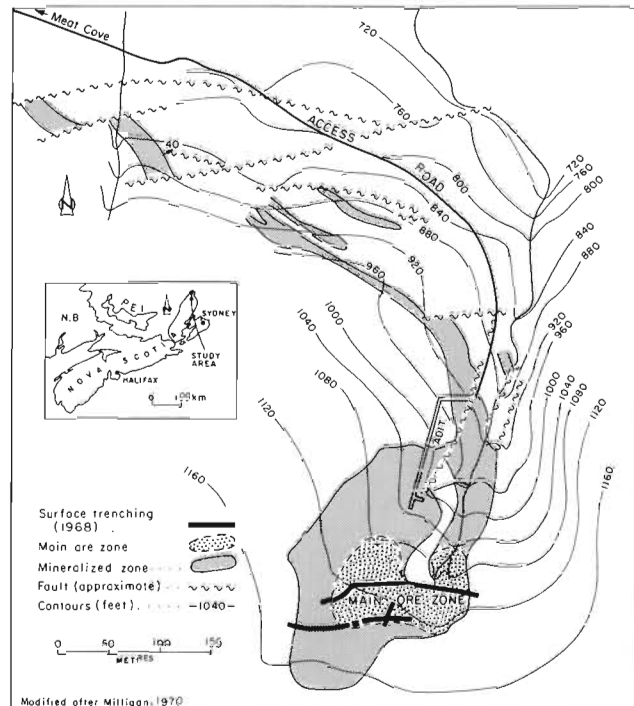


Figure 15. Location map showing brucitic marble deposit at Meat Cove, Inverness County.

The extension of the crystalline limestone unit has been traced (Dunbar, 1965) over a strike length of 730 m and outcrops have been found 1280 m southeast of the main section. The indicated widths range from 18 m on the northern end to approximately 120 m on the southern end. The dips range from horizontal to 45° east.

Reserves of 4.3 Mt grading 12-18% brucite and 4.0% zinc have been defined by trenching and diamond drilling (Dunbar, 1965). Economic concentrations of cadmium, germanium and silver are indicated. A grab

sample collected near the adit during a 1988 visit by the author contained 20.32% brucite and assayed as shown in Table 8.

Table 8. Analysis of Meat Cove brucite ore collected by the author during 1988 visit to deposit.*

| % | | | | |
|-------|-------|------------------|-------|------|
| Ca | MgO | H ₂ O | LOI | Fe |
| 35.30 | 17.19 | 6.27 | 37.05 | 1.67 |
| ppm | | | | |
| Zn | Cd | Ag | Ge | |
| 7000 | 19.3 | 3.0 | 2.3 | |

*Analyzed by Minerals Engineering Centre, Technical University of Nova Scotia, Halifax.

The property historically has been explored for its zinc potential, but the contained brucite, cadmium, germanium and possible silver concentrations all add to the economic viability of this property.