Introduction

Fersmite (Fermi et al., 2019) is a complex mineral, occurring as a very rare accessory mineral associated with peraluminous magmatic rocks containing Nb, Ta, Ti. It is a calcium niobate-tantalate-phosphate of the columbite-tantalite family, with nominal formula \( \text{Ca}_{x} \text{Nb}_{y} \text{Ti}_{z} \text{O}_{w} \text{PO}_{4} \). While the composition of fersmite is variable, it is typically characterized by niobium, tantalum, titanium, and calcium.

In the Mount Brussilof deposit, fersmite is associated with dolomite and carbonatite, and its occurrence post-dates sparry dolomitization. The Mount Brussilof fersmite occurrence is characterized by strongly-zoned, commonly fractured and cut by late dolomite.

The objectives of this study are to: 1) describe the Mount Brussilof fersmite occurrence; 2) characterize the Mount Brussilof fersmite occurrence; and 3) measure the spatial distribution of major and trace elements in the Mount Brussilof fersmite occurrence.

Geologic setting

Mount Brussilof is a peralkaline carbonatite complex located in the Canadian Cordillera, southeastern British Columbia. The Mount Brussilof deposit is associated with dolomite and carbonatite, and its occurrence post-dates sparry dolomitization.

Fersmite

Fersmite (Fermi et al., 2019) is an accessory mineral of the fersmite group which forms the fersmite phase. The fersmite phase is characterized by high Nb/Ta ratios and shows wider variation along the Nb-Ca axis relative to carbonatite-hosted fersmite. Fersmite has a higher Nb/Ta ratio and shows wider variation along the Nb-Ca axis relative to carbonatite-hosted fersmite.

Potential use of fersmite as a direct indicator mineral

Definitions:

Potential direct indicator: Distinct element that occurs in close spatial association with a distinct economic mineralization, and its usefulness may extend to exploration for peralkaline intrusions and pegmatite-related deposits. More data are needed to produce more robust discrimination diagrams.

Summary

The Mount Brussilof fersmite occurrence is characterized by niobium, tantalum, and titanium. It occurs commonly fractured and cut by late dolomite.

Acknowledgements

The Mount Brussilof deposit is located in the Canadian Cordillera, southeastern British Columbia. The Mount Brussilof deposit is associated with dolomite and carbonatite, and its occurrence post-dates sparry dolomitization.

References


MacKay et al. (2016) and Simandl et al. (2017). Its usefulness may extend to exploration for peralkaline intrusions and pegmatite-related deposits. More data are needed to produce more robust discrimination diagrams.

Potential use of fersmite as a direct indicator mineral:

Fersmite has the potential to be used as a direct indicator mineral for peralkaline intrusions and pegmatite-related deposits. MacKay et al. (2016) and Simandl et al. (2017). Its usefulness may extend to exploration for peralkaline intrusions and pegmatite-related deposits. More data are needed to produce more robust discrimination diagrams.

Direct indicator mineral concept:

The direct indicator mineral concept is a method that provides a more robust discrimination diagram than traditional indicator mineral surveys involving hand picking. It is a method that uses a combination of traditional and modern analytical methods to identify potential economic mineralization.

Fig. 10. Compositional LA-ICP-MS maps of fersmite grains from Mount Brussilof Mine. Zoning in the Mount Brussilof fersmite crystals may reflect variations in the Nb/Ta ratio and other trace elements.

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