

Contamination of layered intrusions: the Lac Doré Complex example

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Magmatic processes prevail in the formation of some deposits (e.g. Fe-Ti-V), and unrevealing these processes is essential to provide a scientific basis to exploration models. This study focuses on the large Archean tholeiitic layered intrusion of the Lac Doré Complex, Abitibi Subprovince, Chibougamau area, Québec, Canada, that is currently explored for V. This intrusion has been mostly studied by G.O. Allard in the 70-90s, who proposed that assimilation strongly impacted the evolution of its upper units; i.e. the Si-Na-enriched Sodalgranophyre and to the Fe-Ti-V-enriched Layered Zone. This hypothesis is tested by performing a detailed chemical and petrological investigation of an "unusual" portion of the Layered Zone (i.e. Sorcerer Mountain area, explored by Vanadium One Energy Corp). The studied area is dominated by olivine (now serpentine) and magnetite, has a lower fO_2 than the rest of the Layered Zone, and has likely interacted with a sulphide-bearing mafic contaminant. The V content of the magnetite, a mineral particularly useful in altered and metamorphosed contexts, points to progressive differentiation. It is concluded that the studied portion of the Layered Zone mostly formed from the fractional crystallisation of a slightly contaminated Fe-enriched tholeiitic residual magma.

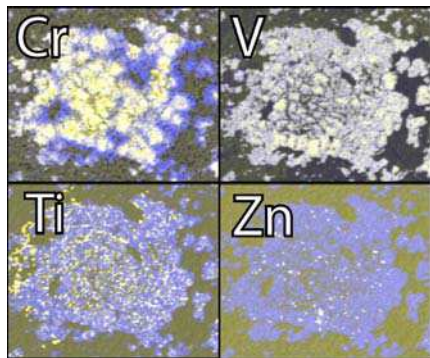


Figure: LA-ICP-MS maps of a 1.5 mm long Lac Doré Complex magnetite (see Cr, V) with ilmenite exsolutions (Ti) and sulphide micro-inclusions (Zn).