

Chromite cluster formation within the Rum Layered Igneous Complex, NW Scotland: A multi-modal approach.

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The mechanism of chromite chain and cluster formation in igneous rocks is a highly debated topic (*e.g.*, [1-5].), with wider relevance due to the tendency for chromite-rich cumulate to host economic concentrations of the critical platinum group metals. Recently, [6] argued that chromite seams within the UG2 chromitite of the Rustenburg Series of the Bushveld intrusion were produced by the accumulation of clusters and chains formed by synneusis of rounded grains. In the same study they showed, using the principles of physics, that the currently popular argument for *in-situ* nucleation and growth via a process involving 'heterogeneous self-nucleation' for these systems is implausible. Here we present multi-modal analysis (X-ray tomography, energy dispersive x-ray spectroscopy, and electron backscatter diffraction) of chromite chains and clusters from Units 7/8 and 10 peridotites, Rum Layered Suite, Scotland. Our data show the individual chromite grains within the clusters and chains exhibit random relationships to one another, in agreement with the results of [6] for the UG2 chromitite. This suggests either that the Unit 7/8 and 10 peridotite clusters formed by synneusis of rounded grains, or that they accumulated as single grains, forming a framework (chicken-wire texture: [7]) by sintering together in the porosity between the surrounding olivine primocrysts.

References:

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