

ISOTOPE GEOCHEMISTRY OF THE ROCK CANYON CREEK FLUORITE-REE DEPOSIT, BRITISH COLUMBIA, CANADA

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The Rock Canyon Creek fluorite-REE deposit in SE British Columbia is hosted by Lower Paleozoic dolostones, and forms an elongate, strata-parallel zone. REE-rich, carbonate-hosted disseminated, vein and breccia-matrix fluorite mineralization dominates and is characterized by fine-grained fluorite with lesser barite, REE minerals, quartz and carbonates. Less abundant, massive fluorite mineralization is characterized by the presence of alumino-fluoride minerals (e.g. prosopite and cryolite). Evidence for extensive replacement suggests that deposition of fluorite and the Ca-REE-fluorocarbonates parsite and synchysite resulted from reaction of a F and REE-bearing hydrothermal fluid with the dolostones. The mineralogy and geochemistry of the deposit support the previously made assertion that the mineralization is related to carbonatitic/alkalic magmatism.

The host rocks are pervasively replaced by ferroan dolomites which are significantly depleted in $\delta^{18}\text{O}$ relative to the local protoliths (limestone and dolostone), but only slightly depleted in $\delta^{13}\text{C}$, and in which $\delta^{18}\text{O}$ and $\delta^{13}\text{C}$ co-vary. More widely distributed non-ferroan dolomites show less depletion in both isotopes relative to the host rocks. The Fe-dolomite values are comparable to those of other epigenetic dolomites in the Canadian Rocky Mountains that have been ascribed to a Lower Paleozoic, regional, fluid flow event. However, modelling indicates that such values are consistent with reaction between a carbonatite-derived fluid and the host carbonate sequence. This is borne out by Sr isotope data which indicates that the Fe-dolomite is relatively non-radiogenic ($^{87}\text{Sr}/^{86}\text{Sr} \sim 0.704$) compared to other carbonates from Rock Canyon Creek ($^{87}\text{Sr}/^{86}\text{Sr} \sim 0.708\text{--}0.7015$) and other areas in the Canadian Rockies.