

Mineral chemistry and alteration of rare earth element (REE) carbonates from alkaline pegmatites of Mount Malosa, Malawi

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ABSTRACT

In this study, the mineral chemistry and alteration of bastnäsite-(Ce), parisite-(Ce), and synchysite-(Ce) was investigated by EMPA, TG, DTG, CHNS, and SCXRD techniques. Relevant chemical data on light and volatile elements and X-ray diffraction data useful to evaluate the effect of OH content on the unit-cell volume of such carbonates are provided. Significant amounts of OH in both the parisite-(Ce) and synchysite-(Ce) were found, and these data are the first direct evidence of hydration for these carbonates. Single-crystal X-ray diffraction data showed that hydration causes an increase in the unit-cell volume for parisite and synchysite. Parisite-(Ce) and synchysite-(Ce) OH end-members have not been described in nature so far, and the amount of water must be taken into account for evaluating changes in stability field conditions. Textural relationships and replacement processes are discussed.

Keywords: Ca-REE carbonates, Mount Malosa, Malawi, hydration