Petrographic study of the Al-rich phosphate mineral associations of the Rubindi-Kabilizi pegmatite, Gatumba area, Rwanda.

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In the open pit of the Rubindi - Kabilizi mine, the loose blocks show K-feldspars and cleavelandite, both deeply altered. Besides remnants of the quartz core, we noticed a few masses of quartz with fragments of completely kaolinized spodumene crystals, as well as coarse-grained masses of green mica mixed with quartz similar to the greisens described by Varlamoff (1963). These field observations lead us to conclude that Rubindi-Kabilizi was another lithium-rich pegmatite, strongly albitized in the Gatumba field. We also reported striking phosphate associations with dominant amblygonite-montebrasite recalling the aluminium-rich phosphate associations already known in Buranga (Von Knorring, 1970) or in Rusororo (Fransolet, 1989).

In these associations, on the basis of the ratio F/(F + OH) (Černa *et al.,* 1973), three members of the amblygonite - montebrasite series, $LiAlPO_4(F,OH)$, were distinguished.
The F-richest montebrasite (2.6 wt. % F) shows exsolutions of lacroixite and is intimately associated with scorzalite I, $FeAl_2(PO_4)_2(OH)_2$, (1.7 wt. % Mg). The petrographic textures strongly suggest a sincrystallization of montebrasite and scorzalite.
The second generation of montebrasite (about 1 wt. % F) forms a chess-board texture with augelite, $Al_2(PO_4)(OH)_3$, and occurs in a more complex association, with prevailing brazilianite, $NaAl_3(PO_4)_2(OH)_4$, scorzalite II (0.25 wt. % Mg), and ferrorosemaryite, $NaFe^{2+}Fe^{3+}Al(PO_4)_3$, (Hatert *et al*., 2005) and subordinate trolleite, $Al_4(PO_4)_3(OH)_3$.
The last generation of a virtually pure montebrasite, associated with quartz and sometimes trolleite and berlinite, $AlPO_4$, is rare.
These mineral associations are crosscutted by veins containing bertossaite, $Li_2Ca\ Al_4(PO_4)_4(OH)_4$, which occurs as a late hydrothermal product. The Rubindi-Kabilizi mine constitutes the second occurrence of this relatively rare mineral, previously described in the Buranga pegmatite (Von Knorring and Mrose, 1966).
Variscite, wavellite, childrenite, souzalite, and turquoise have been identified as usual weathering minerals.

A paragenetic sequence can be proposed: montebrasite I + scorzalite I + lacroixite (?) ⇒ montebrasite II + scorzalite II + ferrorosemaryite + augelite + brazilianite ⇒ montebrasite III + berlinite + trolleite ⇒ bertossaite. Selected crystallochemical features, dealing with Fe, Li, Na, and Ca, are discussed.

References

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