

BERTOSSAITE, $(\text{Li}, \text{Na})_2(\text{Ca}, \text{Fe}, \text{Mn})\text{Al}_4(\text{PO}_4)_4(\text{OH}, \text{F})_4$, A NEW MINERAL FROM RWANDA (AFRICA)*

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A faintly-pink massive mineral from the Buranga lithium pegmatite in Rwanda constitutes a new species, $(\text{Li}, \text{Na})_2(\text{Ca}, \text{Fe}, \text{Mn})\text{Al}_4(\text{PO}_4)_4(\text{OH}, \text{F})_4$, and represents the calcium analogue of the strontium mineral palermoite. The mineral is named bertossaite (ber-tōs-sá-a-ite) for Antonio Bertossa, Director of the Geological Survey of Rwanda. Associated minerals are amblygonite, lazulite-scorzalite, augelite, brazilianite, apatite, crandallite, and quartz. Field evidence suggests that bertossaite formed during a late calcium-phase mineralization of the pegmatite.

Bertossaite is orthorhombic, I^*aa ; $a = 11.48 \pm 0.01 \text{ \AA}$, $b = 15.73 \pm 0.02$, $c = 7.23 \pm 0.01$; $D_m = 3.10 \text{ g cm}^{-3}$; $D_o = 3.10 \text{ g cm}^{-3}$, for $4[\text{Li}_2\text{CaAl}_4(\text{PO}_4)_4(\text{OH})_4]$. The x -ray diffraction powder pattern shows the following strong lines (hkl , d_{hkl} , I); 202, 3.056 \AA (100); 022, 3.286 \AA (70); 321, 3.104 \AA (70); 400, 2.872 \AA (60); 242, 2.144 \AA (60); 220, 4.628 \AA (50); 251, 2.575 \AA (50). In appearance bertossaite closely resembles amblygonite but has less pronounced cleavage; cleavage (100) is good. Fracture is uneven to subconchoidal. Luster is vitreous to glassy. Hardness is 6. The mineral dissolves very slowly in HNO_3 . Bertossaite does not fluoresce. In transmitted light grains are colorless and non-pleochroic; $\alpha = 1.624$, $\beta = 1.636$, $\gamma = 1.642$ (all ± 0.003), $(-)$ 2V moderately large; $r < v$, moderately strong; $X = a$, $Y = c$, $Z = b$.

The resemblances between x -ray diffraction patterns of bertossaite and of attacolite indicate that their structures are similar although the two minerals are not isostructural. A crystallographic study of pink attacolite from Westana, Sweden, taken into consideration with reported analyses and a recent spectrographic analysis, permits postulation of a new formula, $8[(\text{Ca}, \text{Mn}, \text{Fe})\text{Al}_2(\text{P}, \text{Si})\text{O}_4]_2(\text{OH})_2$, and indicates that attacolite is isotypic with carminite, $8[\text{PbFe}_2(\text{AsO}_4)_2(\text{OH})_2]$. Attacolite has space group I^{***} , $a = 11.46 \pm 0.01 \text{ \AA}$, $b = 15.71 \pm 0.02$, $c = 7.28 \pm 0.01$; $D_m = 3.24 \text{ g cm}^{-3}$, $D_o = 3.27 \text{ g cm}^{-3}$. The chemical relation among bertossaite, palermoite, attacolite, and carminite is apparent when the latter two formulas are recast to read $4[(\text{Ca}, \text{Mn}, \text{Fe})_2\text{Al}_4(\text{PO}_4)_4(\text{OH})_4]$ and $4[\text{Pb}_2\text{Fe}_4(\text{AsO}_4)_4(\text{OH})_4]$.

*The name has been approved by the Commission on New Minerals and Mineral Names I.M.A.

PYROAURITE AND STICHTITE FROM LANGMUIR TOWNSHIP, ONTARIO

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Fron del (1941) made an intensive study of the minerals pyroaurite, stichtite, and hydrocalcite. During the course of his study he discovered and described three related minerals: sjögrenite barbertonite, and manasseite. The relationships of these minerals are summarized below. All unit cell dimensions are in \AA .

Pyroaurite Group Rhombohedral	Chemical Composition	Sjögrenite Group Hexagonal
Pyroaurite <i>a</i> 6.20, <i>c</i> 46.63	$Mg_6Fe_2CO_3(OH)_{16} \cdot 4H_2O$	Sjögrenite <i>a</i> 6.21, <i>c</i> 15.60
Stichtite <i>a</i> 6.19, <i>c</i> 46.47	$Mg_6Cr_2CO_3(OH)_{16} \cdot 4H_2O$	Barbertonite <i>a</i> 6.18, <i>c</i> 15.55
Hydrotalcite <i>a</i> 6.14, <i>c</i> 46.24	$Mg_6Al_2CO_3(OH)_{16} \cdot 4H_2O$	Manasseite <i>a</i> 6.13, <i>c</i> 15.37

Investigation of drill core samples from Langmuir Township, Ontario has revealed the presence of pyroaurite and stichtite. No evidence of the sjögrenite group has been found.

The Langmuir stichtite is present as small, rounded masses with an average maximum dimension of about three mm. Some masses up to 15 mm have been observed but they are rare. Pyroaurite, on the other hand, is very abundant. It occurs as veinlets and as radiating masses. Pyroaurite makes up about 15% by volume of the 100 feet of core available for study. The pyroaurite is quite evidently an alteration product of magnetite. Grains of magnetite are often surrounded by radiating rims of pyroaurite.

TIN-BEARING GARNET AND PYROXENE FROM SKARN IN THE CASSIAR DISTRICT, B.C.

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Coarsely crystalline brown garnetite, found just north of the pass at Lat. $59^{\circ} 17\frac{1}{2}'N$, Long. $130^{\circ} 31'W$, yielded 1.1% tin on spectrographic analysis. The garnetite occurs among crystalline limestone and garnet, pyroxene, and vesuvianite skarns near their contact with granodiorite, but occupies only a single small area and may be exotic. Dark pyroxene-rich garnet-free skarn from a boulder a few hundred feet south of the pass contains 0.78% tin. A green pyroxene-rich skarn contains 0.04% tin and other vesuvianite-pyroxene-garnet skarns in the area yielded up to 0.026% tin. A vesuvianite sample contained 0.012% Be.

The tin-rich garnetite is composed of about 65% interlocking crystals of deep green garnet up to 25 mm across and about 35% finer brownish-green pyroxene. The garnet is finely banded in concentric zones parallel to the crystal outlines, the bands showing distinct but variable optical anisotropy. The pyroxene, near augite in optical properties, is mainly in anhedral interstitial masses and in thin bands along the zone boundaries within the garnet crystals.

Tin distribution in the co-existing skarn silicates has been studied by electron probe and spectrographic techniques. Analysis of the garnet indicates that it is virtually a pure stannian andradite end-member in which the depth of green coloration in the zones can be correlated with tin content.

TALC-CARBONATE ALTERATION OF SOME SERPENTINIZED ULTRAMAFIC ROCKS SOUTH OF TIMMINS, ONTARIO

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Serpentinized peridotite bodies south of Timmins, Ontario have been extensively altered to talc and carbonate. In some places, rocks altered in this way have subsequently been decarbonated and converted back to a serpentine-magnetite assemblage. Textures in the rocks indicate that the alteration has involved no change in volume. Eleven variably altered rocks have been analyzed and the analyses re-calculated in terms of the