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Rare and problematic secondary minerals in the Furnas Formation, Paraná Basin, Paraná, Brazil

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Rare and problematic secondary minerals occur as superficial white crusts in quartz sandstones of the Furnas Formation, Paraná Basin, Paraná state, Brazil.

Sasaite [1], $(\text{Al,Fe})_{14}(\text{PO}_4)_{11}(\text{SO}_4)(\text{OH})_7 \cdot 84\text{H}_2\text{O}$, and an unnamed dehydration product occur in the vicinity of the Metamorfose and Chapadinha I shelters, in Piraí do Sul. “Sveite” [2], $\text{KAl}_7(\text{NO}_3)_4(\text{OH})_{16}\text{Cl}_2 \cdot 8\text{H}_2\text{O}$, was found in three caves (shelters) in the municipalities of Ponta Grossa and Piraí do Sul. The mineral name is in quotation marks because several isostructural minerals are so called. In one of the X-ray diffractograms, the association of a more hydrated species was verified. Semiquantitative chemical analyses by EDS verified predominance of Cl over SO_4 , similar to what was observed in the original occurrence of sveite, but different from what occurs with other occurrences. Preliminary data also suggest low K values and NH_4 richness. Other Al-rich nitrates have been recorded, but the X-ray diffraction patterns do not match any known mineral or chemical compound.

Rossiantonite [3], $\text{Al}_3(\text{PO}_4)(\text{SO}_4)_2(\text{OH})_2(\text{H}_2\text{O})_{10} \cdot 4\text{H}_2\text{O}$, was collected in Bela Vista do Rigatoni cave, Ponta Grossa. It contains part of a small invertebrate trapped during the mineral precipitation. This is the second worldwide occurrence of the mineral.

A mineral was identified as tinsleyite [4], $\text{KAl}_2(\text{PO}_4)_2(\text{OH}) \cdot 2\text{H}_2\text{O}$, in Ponta Grossa and Piraí do Sul, but preliminary chemical analyses indicate low values of K and richness in NH_4 , which could therefore be the mineral ammoniotinsleyite, $(\text{NH}_4)\text{Al}_2(\text{PO}_4)_2(\text{OH}) \cdot 2\text{H}_2\text{O}$.

Taranakite [5], $\text{K}_3\text{Al}_5(\text{PO}_3\text{OH})_6(\text{PO}_4)_2 \cdot 18\text{H}_2\text{O}$, was identified in two samples from Piraí do Sul, but low K values and richness in NH_4 may indicate that it is the phase $(\text{NH}_4)_3\text{Al}_5(\text{PO}_3\text{OH})_6(\text{PO}_4)_2 \cdot 18\text{H}_2\text{O}$, known only synthetically.

References:

[1] Martini J. (1978) *Min Mag* 42: 401–404; [2] Martini J (1980) *Trans Geol Soc South Africa* 83: 239-241; [3] Galli E et al. (2013) *Am Min* 98: 1906-1913; [4] Dunn P et al. (1984) *Am Min* 69: 374-376. [5] Hector J. and Skey W. (1865) *Reports Jurors, New Zealand Expedition*, pg. 423.