Is Francolite a Mineral? No, it is a Paramineral

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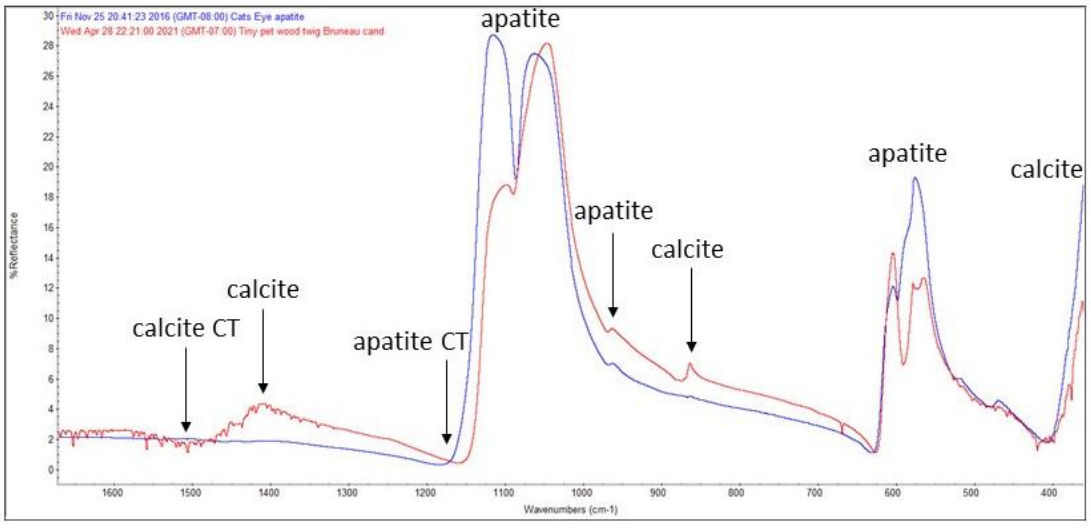
One would presume that since such esteemed online mineral sources such as mindat and webmineral call francolite a mineral, that this is beyond question. Here, we discuss what an infrared spectrometer sees. Atomic mineral groups in infrared have various vibrational bands, and francolite, where carbonate substitutes for phosphate in some locations, would have a new set of peaks that are neither pure carbonate nor phosphate, indicating this lattice structural change. Is this what we see?

No, we see two graphs that are overlaid; one is calcite and one is apatite, as shown below. In addition, each mineral has one distinct Christiansen Trough, and francolite has two. It has the CT of calcite and the CT of apatite. From an infrared standpoint, this is a paramineral, a close-knit combination of minerals that are interspersed together. It results from caging of calcite in phosphate positions without crystal structure changes.

Francolite is not the only paramineral. The borosilicates that includes dumortierite, tourmaline, howlite. The boron group has one CT, and the silicate group has another in these minerals. The aluminosilicate sillimanite has this behavior as well. Many minerals in the evaporite group such as hanksite and apthitalite have this behavior. Hanksite is a paramineral combination of carbonate and sulfate groups.



Francolite reflectance infrared spectrum.