

An update to the study of bronzite and tiger's eye

Donald Kasper, 8-18-2017

This is an update to an infrared study of bronzite, posted on 8-13-2017, and pietersite and tiger's eye posted 8-9-2017.

Improved infrared laser throughput by 300% allows for a better look at mineral water, which can be used to identify some minerals when they have unique spectral water band positions and shapes. We now have conclusive data.

A study of presumed bronzite enstatite beads and a slice are shown to be quartz, iron, and cummingtonite. The water bands of cummingtonite are unique and clearly identify this group, of which there are several variants with more manganese, magnesium, or iron. It is not clear without good references which subtype these specimens are, but does match a Japanese paper by Kiyotaka Ishida (1989) as manganese cummingtonite. The others may have similar water bands. These bronzite specimens are rocks with no enstatite present. Again, this is not a study of chondrite meteorites contents with their "bronzite."

There are two groups of papers on tiger's eye. American sources state that it gets its fibrosity from riebeckite, yet there are Ukrainian and Russian papers of similar rocks that talk about cummingtonite. Better infrared throughput and an aim on the blue to yellow tiger's eye slice of the author show conclusively the mineralization in that specimen, apparently African, is cummingtonite.

Below is the spectral software screen snapshot of the author identifying the water bands of the tiger's eye specimen. The only difference between a pietersite and a tiger's eye is that pietersite is a breccia with complex fans of cummingtonite, while the tiger's eye is stacked. Stacking occurs perpendicular to strong pressure gradients in metamorphic systems and may be the cause of this stacking.

Update:

In addition to that a French paper on Camaroon talcs (Nkoumbou, et.al., HAL archives, 2006) shows that the 3675 and 3664 cm^{-1} bands are linked to tremolite and magnesioriebeckite seen in this scan. Cummingtonite makes the 3650, 3636, 3618 and 3567 cm^{-1} bands. So the African tiger's eye is mixed.

Screen snapshot of spectral software identifying the key water bands in a tiger's eye specimen. It appears tremolite/magnesio-riebeckite (TR) makes the 3675 and 3664 cm^{-1} bands, while cummingtonite makes the 3650, 3636, 3618, and 3567 cm^{-1} bands. The magnitude of the bands is hard to assess as the two TR bands are in a large water roll, but appear smaller and hence are less than the cummingtonite in occurrence. Reflectance infrared scan by Donald Kasper.

