The Composition of Austrian Pinolith (Pinolite)

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Google makes it clear that Austrian pinolith is magnesite (magnesium carbonate) in a matrix of graphite and dolomite. This is repeated on geology.com, the web site of PhD geologist Hobart M. King. It is further repeated in that bastion reference of geologic science, mindat, stated as:

> "Name for graphite pigmented light grey to almost black dolomite with inclusions of white magnesite grains looking like pine kernels (Italian "pinola" hence the name)."

With infrared spectroscopy, looking at slices off a large boulder provided by geologicalspecimensupply.com, the author was able to get slices with large black matrix areas to scan in reflectance infrared. The crystals are magnesite with some salt. The matrix turns out to likely be anhydrous microgranular talc, and magnesite occurring. Infrared spectroscopy shows zero dolomite and zero limestone (calcite) (Figure 1).

It is possible this identification is conflated with Chinese chrysanthemum stone whose inclusions are dolomite and whose matrix is quartz and calcite (siliceous limestone). The Chinese material in its classic form makes radial or flower "blooms" and the white crystals are blocky, segmented dolomite. The superficial look is quite similar to Austrian pinolith, but the Austrian rock was subjected to metamorphic pressure forming an anhydrous talc (a magnesium silicate) and the magnesite lozenge shaped crystals.

The infrared spectra of talc mineral specimens and talcum powder compared to the matrix are shown in Figure 2. The matrix is not classical talc, missing a prominent roll at 1100 cm-1, shifting of other bands, and the fact it has no water in its spectrum, as shown in Figure 3. This appears to be a new species of talc, an anhydrous talc. The black pigmentation does not register as anything obvious in infrared.

Gemological data. The specimen calculation is a specific gravity of 2.73 determined using a gram scale with a resolution of 0.01 grams using a 4.80 gram chip, dry weight and weight suspended in a small plastic cup of water by a fine nylon thread where SG = dry weight/water suspended weight. This makes it the same as talc that has an SG of 2.58-2.83. Its refractive index is indeterminate by gem refractometer since it is opaque. Its hardness is 1, the same as talc. And, for those without pictures of this material, the matrix is charcoal black (Photo 1).

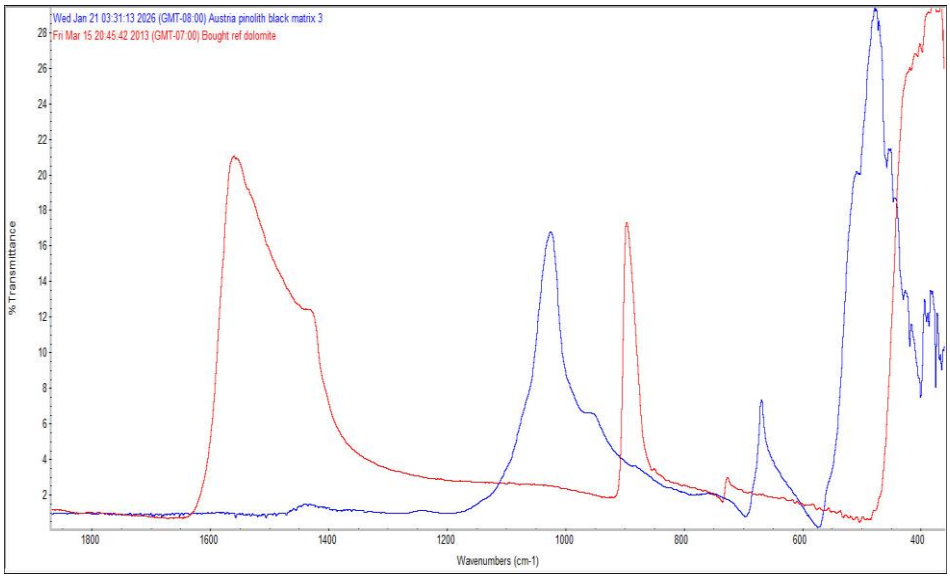

Figure 1. Dolomite reference (red) versus Austrian pinolith (blue) matrix anhydrous talc with trace magnesite. No peak matches. No dolomite is present.

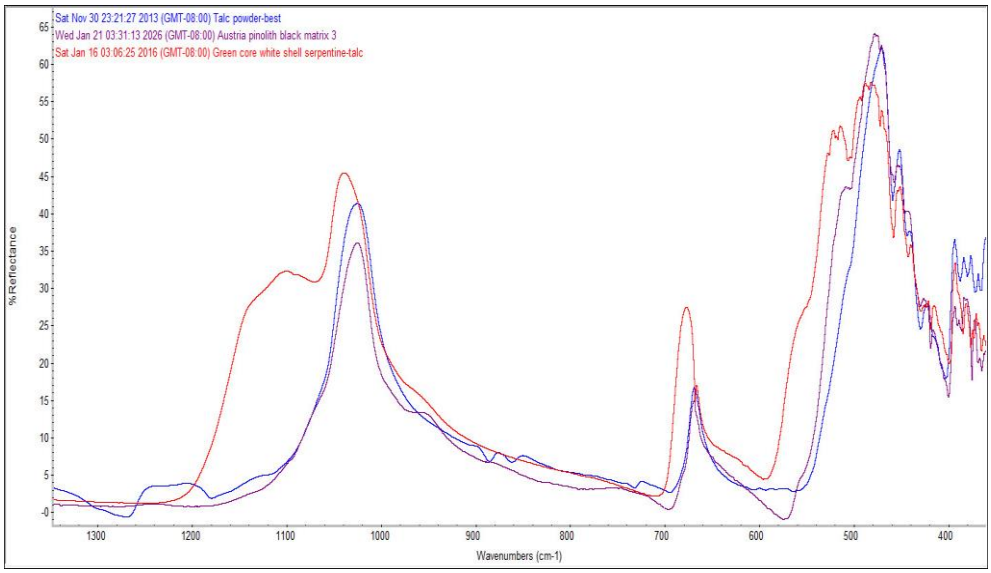

Figure 2. Infrared spectra of pinolith matrix (magenta), mineral talc (red), and talcum powder (blue). The lack of the 1100 cm-1 roll in pinolith matrix talc shows that it is microgranular like the talcum powder. For mineral talc, the peak at around 675 cm-1 is shifted to higher wavenumbers.

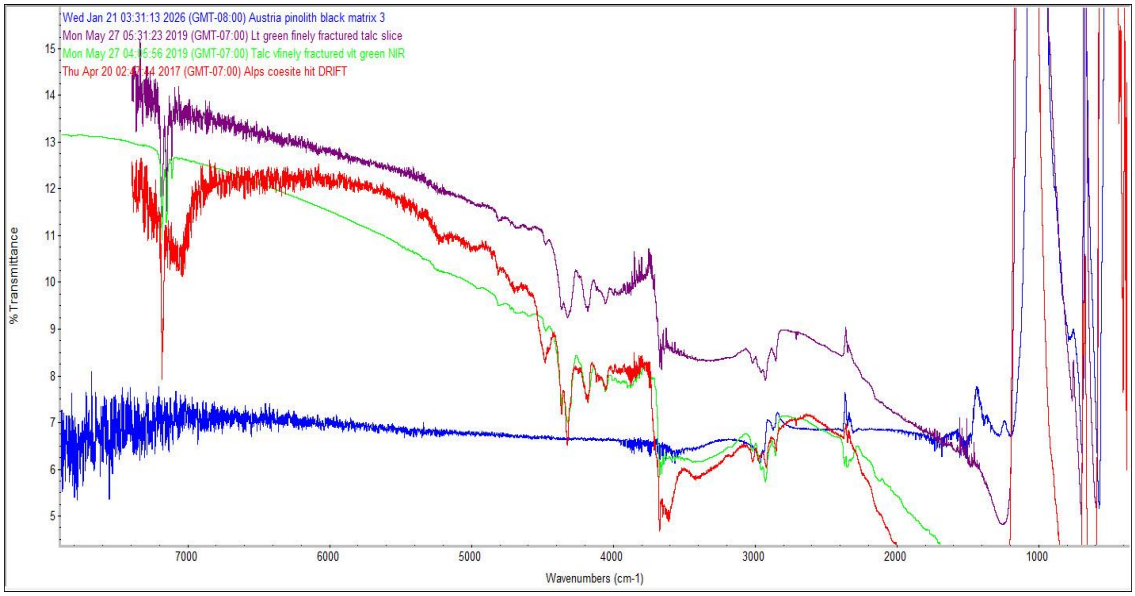

Figure 3. Zoomed in water region spectra comparisons of 3 talc mineral samples (green, red, purple) compared to Austrian pinolith matrix (blue). The pinolith matrix has no water. Bands around 2900 cm-1 are atmospheric water, and bands around 2300 cm-1 are atmospheric CO2. A background spectrum is run first to subtract these out, but as samples are run trace amounts get into the spectrometer through its sample pinhole. The laser is bounced through the pinhole to the mineral face, then reflects back down into the sample unit and is guided by mirrors to a detector. The talcum powder spectrum for water is not shown since it was derived by sticking powder onto tape, it picks up tape carbon compound water all over the spectrum including a glue quartet, etc., but no talc bands are found, so it is anhydrous as well.

Photo 1. A 6x5 inch slab cut of Austrian pinolith.

Conclusions:

Austrian pinolith is a metamorphic magnesium world of magnesite blades with some salt, and a matrix of a new talc species the author calls anhydrous talc, with trace magnesite.