China chrysanthemum stone—evidence of metamorphic exposure?

Donald Kasper 6-22-2017, updated 1-2-2024

There is a description and picture of a chrysanthemum stone under the section on celestite/celestine on Mindat that reads as follows:

“2008, Michael, C. Roarke, Celestine, Yonghe sepiolite mine, Yinghe, Liuyang Co., Changsha Prefecture, Hunan Province China. 90 x 50 mm specimen of the Celestine variant “chrysanthemum stone”. White Celestine in polished dark metamorphic rock. RFC C1520.”

The Mindat page on chrysanthemum stone reads in part as follows:
“The composition of chrysanthemum stone is variable. Material from the "classic" occurrence at Yonghe in Liuyang County of Hunan Province consists of celestine, but specimens recovered from outcrops of the same strata at other places in the area are mostly mixtures of calcite, chalcedony and minor dolomite which replace earlier celestine (Yan et al., 2001). Material from another well known occurrence at Laibin of Guangxi Province consists of strontianite (Zhang and Li, 1999).”

That paper title reads as follows:
“Length-Slow Chalcedony in Chrysanthemum Stone of Chihsia Formation, South China and Its Geological Implications. J Yan, Q Xia, EH Carlson - ACTA SEDIMENTOLOGICA SINICA, 2001 - SCIENCES PRESS”

Let us now use reflectance infrared spectroscopy to study this material. I received two specimens out of China, buffed them to a good polish, and have scanned them in infrared. One photo is attached.

The matrix is black. In infrared this is pure calcite. The black would be from carbon which is not picked up by infrared as it acts like a metal reflector.

The white lozenge columnar blades have many minerals. They include the carbonates calcite, dolomite, aragonite and strontianite. They also have the sulfate barite. Lastly, they have quartz and talc. It is unknown if the talc and quartz is painted in to enhance the blades, but some of the specimens were buffed before scanning, and they could have just as well ground calcite for a pigment enhancement. The specimen photo shown below is very unlikely to be painted, so with talc, this would indicate the rocks have metamorphic exposure.

Infrared conclusively shows that my specimens contain zero celestite/celestine.

In reference to the Yan paper, length-slow refers to moganite, of which none was detected in my specimen.

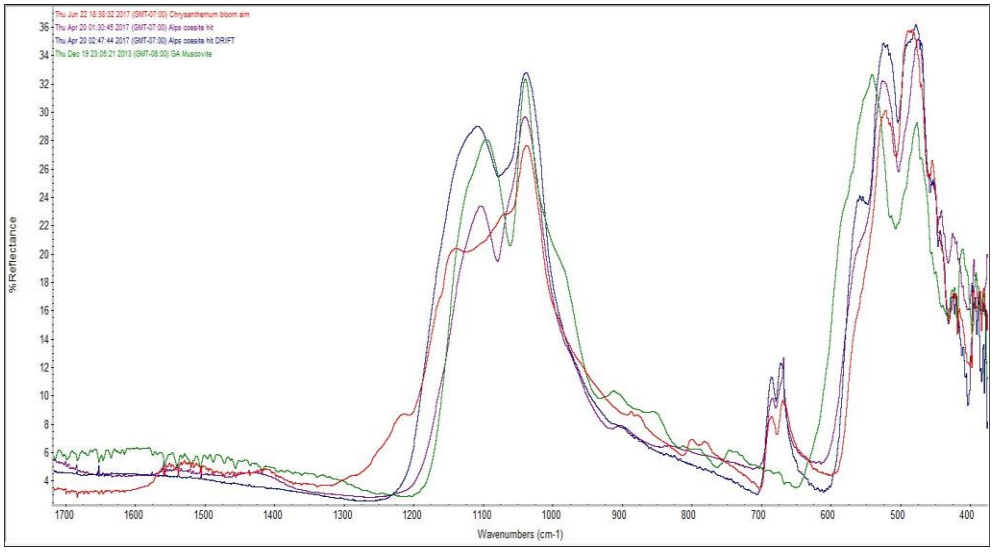
There is also this reference to this material for moganite, which is not found in these specimens:

“Length-slow chalcedony in chrysanthemum stone of Chihsia Formation, South China and its geological implications. Y Jiaxin, EHC XiaQiongxia - Acta Sedimentologica Sinica, 2001”

Conclusions: The blooms are of mixed composition. The talc probably evidences metamorphic alteration of the calcite where the blooms formed. “Talc can form by metamorphic alteration of carbonate rocks, by the replacement of silicified carbonate rocks, or by the alteration of ultramafic rocks.” Malcolm Ross, William Smith, William Ashton, Triclinic Talc and Associated Amphiboles from Gouverneur Mining District, New York, American Mineralogist, Vol. 53, May-June 1968.

Chrysanthemum stone studied with reflectance infrared.

Graph of Chrysanthemum stone bloom, muscovite, and 2 Alps scans with talc. This talc spectrum is different from others the author has, and may be monoclinic talc, other talc being triclinic. Small and broad peak on the far left is calcite. Muscovite is similar but lacking the 700 cm-1 doublet.



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