



The Gem and Jewelry Institute of Thailand (Public Organization)

## LAB UPDATE

### Cymrite: An Unusual Jade Imitation

By GIT-Gem Testing Laboratory

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#### Introduction

In July 2016, The Gem and Jewelry Institute of Thailand's Gem Testing Laboratory (GIT-GTL) received a parcel of green, purple and whitish translucent "jade" stones from a client for identification. Our test results revealed that almost all of these stones, except one whitish sample, were jadeite-jade. A whitish stone was found to be cymrite ( $\text{BaAl}_2\text{Si}_2\text{O}_8 \cdot \text{H}_2\text{O}$ ) which is an unusual jade imitation. In this lab update, we will compare the properties of two whitish stones that appear to be quite similar to each other but belong to different mineral species, one is jadeite-jade and the other is cymrite.

#### Material and methods

These two similar whitish stones weight 1.30 ct. for jadeite-jade sample and 1.13 ct. for cymrite sample (Figure 1). Standard gemological instruments were used to determine the stones properties and their internal features were observed under gemological microscope. For advanced testing, EDXRF spectrometer (model Eagle III), was used for chemical analysis and Laser Raman spectroscopy (model Ranishaw inVia) were used to prove the stones' mineral species.

*Figure 1: Samples of jadeite-jade (left, 1.30 ct.) and cymrite (right, 1.13 ct.) submitted to GIT-GTL for identification.  
Photo by T. Sripoonjan.*



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## RESULTS

### General properties

The standard gemological testing has revealed that these stones are aggregate (AGG) materials observed under polariscope. Their refractive index (RI) by spot reading are approximately 1.66 and 1.62 and their specific gravity (SG) are 3.30 and 3.36 for jadeite-jade and cymrite samples, respectively. Both stones show no reaction to both long-and short-wave UV radiation (see Table 1).

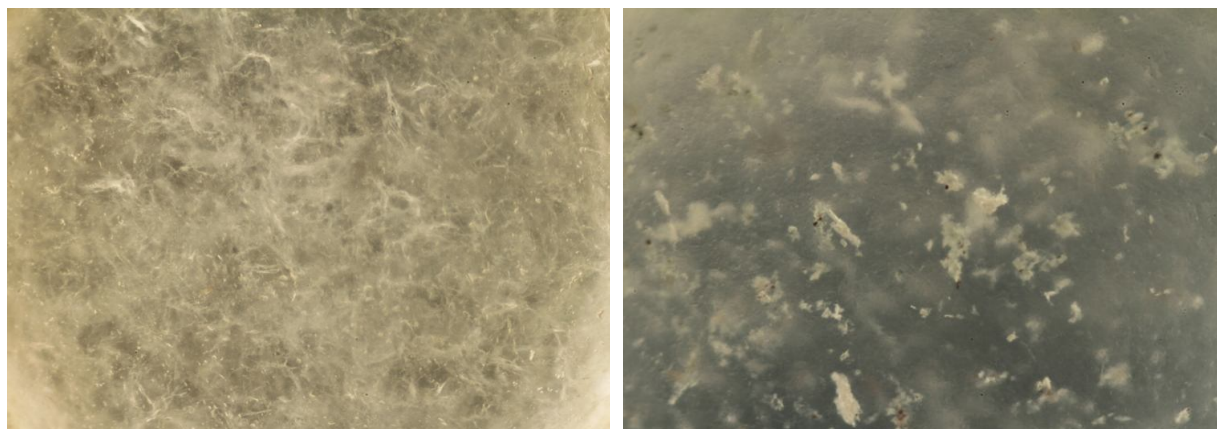
*Table 1: Properties of jadeite and cymrite\**

Properties	Values and Description		
	Jadeite (1.30 ct)	Cymrite (1.13 ct)	Cymrite (ref)
Refractive Index	Approx. 1.66 (spot reading)	Approx. 1.62 (spot reading)	1.61 - 1.62
Polariscope Reaction	AGG	AGG	AGG
Specific Gravity (Hydrostatic)	3.30	3.36	3.41
UV Fluorescence	LW : Inert / SW : Inert	LW : Inert / SW : Inert	LW : Inert / SW : Inert
Inclusions	Fracture, cloud	White inclusions, cloudy appearance	-

Remark: Based on the testing of the samples (as shown in figure 1.) Cymrite mineral properties from [www.webmineral.com](http://www.webmineral.com)

### Microscopic features

Internal features of jadeite-jade sample at high magnification show aggregate structure with cloud of Inclusions (Figure 2, left). Cymrite sample appears cloudy with numerous white particles (Figure 2, right).



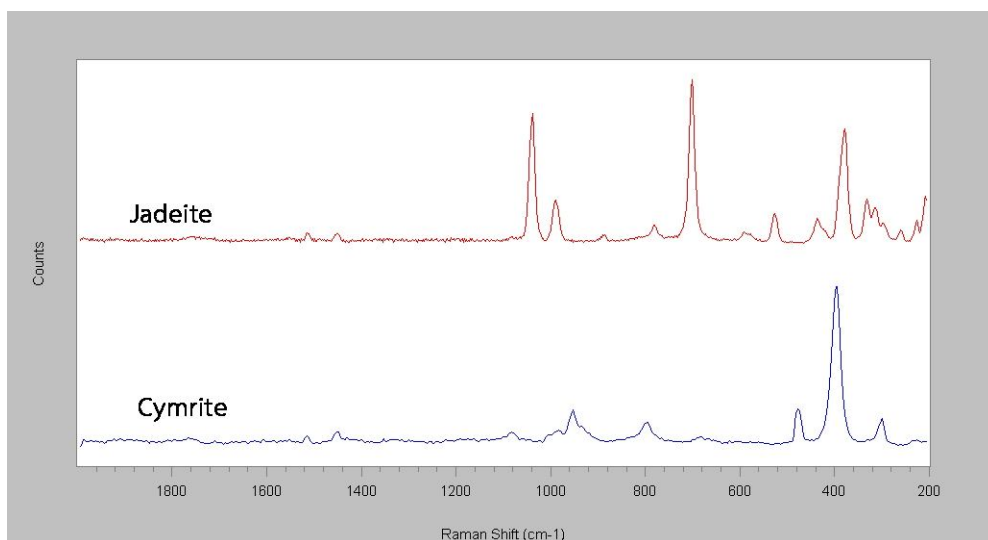
*Figure 2: Aggregate structure and cloud of inclusions in 1.30 ct. jadeite-jade sample (left), magnified 25x, white inclusions in 1.13 ct. cymrite sample (right), magnified 40x. Photos by P. Ounorn.*

## ADVANCED ANALYSIS

The advanced analytical testing, such as Raman spectroscopy and EDXRF spectrometry were used to distinguish of these stones.

### Laser Raman spectroscopy

Raman spectrum collected by Raman spectroscope proved the species of these two stones are jadeite and cymrite, respectively (Figure 3).



*Figure 3: Raman spectra of 1.30 ct. jadeite (top) and 1.13 ct. cymrite (bottom)*

## Chemistry

The semi-quantitative chemical analyses of those stones by EDXRF spectrometer show that the jadeite-jade sample contains high contents of sodium, silicon and alumina with minor amount of iron (Table 2). In contrast, cymrite sample contains barium, silicon and alumina as its major composition (see Anthony et al., 2001).

*Table 2: Chemical contents of jadeite and cymrite obtained by EDXRF.*

Element (Oxide; wt.%)	
Jadeite (1.30 ct)	Cymrite (1.13 ct)
Na <sub>2</sub> O = 8.72	Al <sub>2</sub> O <sub>3</sub> = 29.42
Al <sub>2</sub> O <sub>3</sub> = 24.92	SiO <sub>2</sub> = 36.47
SiO <sub>2</sub> = 66.25	BaO = 34.11
Fe <sub>2</sub> O <sub>3</sub> = 0.11	

## Conclusions

The above evidences reveal the 1.30 ct. stone is a whitish semi-transparent jadeite, the so-called “icy jadeite-jade” (Ou Yang, 2003, pp.39), while the 1.13 ct. sample is a mineral named cymrite that is being used for jade imitation. Cymrite can be found as a naturally occurring mineral or a synthetic material. The basic gemological properties show a very slight difference in the RI and SG values of jadeite and cymrite. Therefore, the advanced testing, such as Raman spectroscopy and EDXRF spectrometer, are required for distinguishing these two mineral species. Because cymrite has a very similar appearance to that of real “icy jadeite-jade”, we recommend traders and jewelers to carefully observe this type of gemstone or acquiring the identification report from a reliable gem laboratory before purchasing.

## Acknowledgements

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