**LEPIDOLITE WITH SIMULATED MATRIX**

By John J. Koivula and C. W. Fryer

This article describes a crystal of gem-quality lepidolite (a lithium mica) with a simulated matrix. Under magnification, numerous gas bubbles were observed in the glue that was used to attach the crystal to the matrix. The main crystal was identified as lepidolite by means of X-ray diffraction.

The authors recently examined an unusual crystal in matrix (figure 1). The crystal specimen, which measured approximately 6.0 cm x 1.7 cm, reportedly came from Brazil. At first glance it looked very much like a fine pink tourmaline in matrix, complete with typical surface striations parallel to the length of the crystal. However, the specimen was much too lightweight to be tourmaline. It was obvious that a more detailed examination and some tests were needed to correctly identify the material.

**TESTING PROCEDURE**

The specimen was first examined carefully under the microscope. It was immediately apparent that the “matrix” was not natural, but had been glued to the crystal. As illustrated in figure 2, the “matrix” contained several areas of an epoxy-like glue in which gas bubbles were trapped. A thermal reaction test carried out on both the “matrix” and the crystal showed that the material simulating matrix was indeed glued on and that some of the glue had been smeared onto the surface of the main crystal, giving it a plastic-coated appearance in a number of areas. A slightly acrid odor and a small puff of white smoke were produced when the hot point was applied to the glue.

We also noted that the “matrix” was composed of numerous small, rounded pebble-like grains that suggested extensive alluvial transport. However, a pink and a green crystal fragment (figure 3) attached at either end of the “matrix” showed very few signs of abrasion. In addition, the large
pink crystal did not show any signs of alluvial abrasion. Gross inconsistencies, to say the least.

Under magnification, the natural-appearing surface striations running lengthwise on the crystal indicated a lamellar internal structure. There was no question now that the pink crystal was natural; it also appeared to be micaceous (figure 4).

Since the large pinkish crystal was translucent, the specimen was checked with a spectroscope, polariscope, and dichroscope. No absorption spectrum was observed using a Beck spectroscope. The polariscope reaction was inconclusive, but the dichroscope showed definite lighter and darker shades of pink, proving the stone to be doubly refractive. During testing with ultraviolet radiation, only the glue reacted, fluorescing a pale whitish yellow. Because of the micaceous structure observed in the main pink crystal and the similarity of this specimen to a specimen of lepidolite that was pictured in a recent book (Sauer, 1982), lepidolite was next suspected.

We decided to use X-ray powder diffraction to conclusively identify the specimen. A spindle was prepared from a minute powder sample obtained from an inconspicuous area of the crystal. The
spindle was then mounted in a Debye-Scherrer powder camera and exposed for 4.2 hours to X-rays generated at 48 KV and 18 MA from a copper target tube. The pattern was measured for d spacing with a Nies overlay corrected for film shrinking. The intensities of the lines were estimated visually. This pattern was then compared with five known lepidolite patterns. It matched the ASTM 14-11 pattern—a two-layered, monoclinic (2M2) structure—almost exactly.

CONCLUSION

Lepidolite cabochons are sometimes encountered by the jeweler, but a large, gemmy crystal such as this is quite rare. Although the crystal examined proved to be a beautiful example of gem-quality lepidolite, the matrix was not genuine. Just as gemologists must cope with synthetic, treated, and assembled gemstones, they must also sometimes deal with gem mineral specimens with simulated matrix, many of which are not as easy to identify as the one reported here. Some specimens may show virtually no evidence of assembly or alteration. In those cases, subtle signs such as inconsistencies in matrix texture or color are often useful clues. Readers interested in additional information are referred to an excellent paper on mineral chicanery written by Dunn, Bentley, and Wilson [1981].

REFERENCES


The Gemological Institute of America wishes to extend its sincerest appreciation to all of the people who contributed to the activities of the Institute through donations of gemstones and other gemological materials. We are pleased to acknowledge many of you below:

Mr. and Mrs. Robert Anderson
Mr. Mario Antolovich
Mr. Ben Ballinger
Mr. Craig Boag
Mr. Jay B. Church
Mr. Frank Circelli
Mr. W. L. Cotton
Mr. Richard T. Daniels
Mr. Gene Dente
Ms. Sandra Dickson
Mr. Randy Dinsclloen
Mr. Frank Faff
Dr. and Mrs. Joseph W. Furrar
Dr. and Mrs. Peter Fussler
Dr. Rodney B. Firth
*Ms. Tula Funk
Mr. Robert E. Gaskell
Mr. Jeffrey Gondler
Dr. Samuel E. Goudler
Dr. Jaime Goldfarb
Mr. Michael P. Goutras
*Mr. Fred L. Gray
*Mr. Walter W. Greenbaum
Mr. Gary A. Griffith
Mr. Mack F. Guttmann
Hamburger Brothers Inc.
Harper's Jewelry Inc.
Mr. Mark Herschele, Jr.
Mr. Eduardo Herrt
Mr. Bill Hines
Mr. Graut E. Hofman
Mr. Nick Itzaly
Mr. J. Clark Johnson
Mrs. S. V. Jones
Mr. Seichi Kawai
Mr. Richard Larson
Mr. Douglas E. Lee
Mr. Jim Letsch
Ms. Betty H. Llewellyn
Mr. Thomas H. Looker
*Mr. Gerald May
*Mr. Michael Menzer
*Mr. George M. Measessmith
Mr. Ronald K. Moore
Mr. William R. Moore
Ms. Julia Myers
Mr. John Ng
Judith Osmer, Ph.D.
*Mr. Roy Orsness
Mr. Laverne W. Rees
Mr. Dean Sanders
Ms. Jeanne Scher
Mr. Jacques Schupf
Dr. William Shalish
Mr. Irwin Shakin
Mr. Jerry Shear
Mr. David B. Sigler
Mr. Ronald H. Tanaka
Mr. Alexander Toibice

*Denotes book donation to GIA Library.