

## PINK GEM QUALITY ORTHOCLASE FROM THE MOGOK STONE TRACT, MYANMAR

U Hla Kyi<sup>1</sup>, U Kyaw Thu<sup>2</sup>

<sup>1</sup> Professor Emeritus, Department of Geology, Dagon University, Yangon, Myanmar

<sup>2</sup> Demonstrator, Department of Geology, Yangon University, Yangon, Myanmar

### ABSTRACT

A pink gemstone that was discovered as rough in the Mogok Stone Tract was studied and found to be facetable orthoclase feldspar, a potassium aluminium silicate gemstone that is very rare in Myanmar. The faceted orthoclase described in this paper is possibly the first find of this gemstone in Myanmar. In this paper the authors provide details of the physical properties and optical properties, XRD features and trace element analysis of this rare pink gemstone.

### INTRODUCTION

Transparent yellow orthoclase feldspar [KAlSi<sub>3</sub>O<sub>8</sub>] is a well known gem mineral throughout the world, with Madagascar being a famous locality. However, transparent pink orthoclase feldspar is very rare. Fortunately, a specimen of transparent pink orthoclase feldspar was found in the Mogok Stone Tract, which is a unique source of world renowned deposits of ruby, sapphire, spinel, peridot, aquamarine, chrysoberyl, zircon, topaz, amethyst, iolite, garnet, moonstone, tourmaline, scapolite, apatite, diopside, and many other collector's gemstones such as amblygonite, andalusite, fibrolite and various other phenomenal gemstones.

A phenomenal gemstone is one that exhibits a special optical effect in visible light, such as the 'gleaming eyes' chatoyant effect known as the cat's-eye effect, and the glittering star effect known as asterismæ as a consequence of which 'stars' of four, six or twelve rays are created due to reflection of incident light from oriented mineral inclusions ('needles') of minerals such as rutile or boehmite.

Over the years, the authors have examined many specimens of opaque (non gem quality) pink

coloured orthoclase feldspar (Fig.1), with their typical Carlsbad twins (simple twin, made up to two similar parts), in many granites and syenites of Myanmar (and indeed the world). But the authors are unaware of whether gem quality facetable pink orthoclase has been mentioned either in the gem literature or in text books of gemmology.

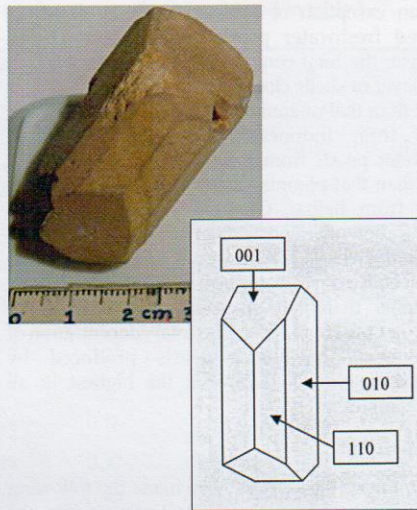


Fig. 1. Opaque pink orthoclase crystal with front pinacoid (100), side pinacoid (010) and prism (110) faces, as specified in the associated diagram.

The authors visited Mogok, and examined a rough pink transparent gemstone that weighed 19.51 grams, and which they thought, at first sight and heft, could be scapolite—a gem mineral that is commonly found in the gem gravels of Mogok. But, when this rough was examined and analysed in the laboratory, surprisingly the pink gemstone was found to be gem quality orthoclase feldspar. This was a very rare discovery that possibly represents the first finding of this new gemstone in the Myanmar's Mogok Stone Tract.

The rough was subsequently faceted to yield the 15.98 ct transparent slightly brownish pink gemstone illustrated in figure 2.

Address for correspondence:  
Emeritus Professor U Hla Kyi  
Macle Gem Trade Laboratory  
No.98/99, Level 3, FMI Center,  
380 Bogyoke Aung San Road,  
Yangon, Myanmar.  
e-mail: macgems@baganmail.net.mm



Fig. 2. Oval shape pink orthoclase weighing 15.98 carats.



Fig. 3 Parallel tube like inclusions in orthoclase. Dark field illumination, 25x magnification.

## RESULTS

The results of our gemmological examination and analyses of this facetable pink orthoclase feldspar are presented in table 1

Colour	Pink
Diaphaneity	Transparent
Lustre	Vitreous
Hardness (Mohs scale)	6
Cleavage	Two sets at right angles
Specific Gravity	2.56
Refractive Indices	1.520 - 1.526
Birefringence	0.006
Optic Sign	Biaxial negative
Pleochroism	Moderate pink to nearly colourless
UV fluorescence (LWUV & SWUV)	Weak orange glow
Chelsea filter	Pink
Inclusions	Numerous 'tube' like parallel inclusions that are mostly of uniform size. (see figure 3).

Table 1. Gemmological characteristics of facetable pink orthoclase feldspar from Myanmar's Mogok Stone Tract.

It was concluded that the gemmological properties tabulated above were consistent with those of orthoclase feldspar.

**X-ray diffraction characteristics**

An X-ray diffraction analysis (XRD) of the specimen was conducted at the University Research Center, University of Yangon, using a Japanese Rigaku Geiger-Flex XRD unit that was fitted with Co tube that operated at 40 kV and 25 mA. The XRD report (Fig. 3) identified the phase as JCPDS (19-0931D) or orthoclase feldspar

μPDSM				Report 16:12,11/16/98				
<b>Input Pattern:</b>								
yms Mogok								
<b>d</b>	<b>I</b>	<b>D</b>	<b>I</b>	<b>d</b>	<b>I</b>	<b>D</b>	<b>I</b>	<b>D</b>
3.563	78	3.305	60	3.227	100	2.9860	47	1.7976
<b>Identified phases:</b>								
JCPDS#	SI	ML/X	At%	Identity . . .				
19-0931D	38	5/1	59	*Potassium Aluminium Silicate / Orthoclase KAlSi3O8				
				Ierr:50,150	derr: 2.0	Bground:22	dmax/min:33.589/1.791	
<b>Summary Report:</b>								
	<b>Full</b>	<b>Resid</b>	19=0913		:			
			59%					
<b>D</b>	<b>I</b>	<b>I</b>	<b>D</b>	<b>I</b>				
3.563	78	71	3.54	7.1*				
			<3,47	27>				
3.305	60	None	3.31	59				
"	"		3.29	36				
3.227	100	61	3.24	39*				
2.9860	47	17	2.992	30				
1.7975	22	None	1.801	9.5				
"	"		1.798	4.8				
* = obscured <.,> = Missing {..} = Previously Removed								

Fig. 3 XRD report that identified the pink rough as orthoclase feldspar

**Trace element analysis**

Trace element analysis by an Atomic Absorption Spectrophotometer (Model; AA-6, Australia) at the Applied Geology Department revealed that this pink orthoclase feldspar contained chromium (0.14 %), iron (0.08 %) and titanium ( 0.06%), It was hypothesized that the pink colour of this feldspar could be due to the presence of chromium replacing aluminium.

**Conclusion**

The rare gem quality pink orthoclase, which is possibly the first finding of facetable pink orthoclase feldspar in Myanmar, is identical in physical, optical and chemical properties to yellow orthoclase—except for colour and spectral characteristics. It is possible that further finds of this facetable pink feldspar could make it a gemstone of interest to gemmologists and gem lovers.

**Acknowledgments**

The authors gratefully acknowledge the assistance of U Ye Myint Swe, of the University Research Center, Yangon and U Han Sein of the Applied Geology Department, Hlaing Campus, Yangon for the XRD and trace element results respectively. The authors also would like to express their thanks to Thuzar Aung, of the Macle Gem Trade Laboratory, for her help with photomicrography and the word processing of this manuscript.

**References:**

1. Deer, W.A., Howie, R.A. and Zussman, J. (1992) An introduction to the rock forming minerals. Longman: London.
2. Klein, C. and Hurlbut, C.S. (1985) Manual of Mineralogy. John Wiley and Sons: New York.
3. Webster, R. (1994) Gems. 5th ed., Butterworth-Heinemann: Oxford.

