



NEW RUBY DEPOSITS IN MOZAMBIQUE

GIT Gem Testing Laboratory (GIT-GTL)
1 March, 2010

Introduction

Since the discovery of paraíba-type tourmaline in Mozambique several years ago, the quality and quantity of precious stones found in that country have pushed it into the spotlight. Thus it is not surprising that Thai dealers are increasingly journeying to Mozambique in search of gems. And with the discovery of ruby in late 2008, a genuine gem rush has occurred.

Thai gem traders in Mozambique

According to a Thai gem dealer doing business near Nanhupo market, there are two major ruby mining areas in northern Mozambique: Lichinga, in Niassa province and Montepuez, in Cabo Delgado province. In Lichinga, prospectors began mining in September 2008. Initially, most of the ruby was sent across the border to Songea, in southern Tanzania. Shortly thereafter, in May 2009 miners moved eastwards to Montepuez. These new ruby deposits have become famous and supply large quantities of rubies into the Thailand market. A small fraction of the material is gem quality, while the majority requires treatment via glass filling before it is suitable for cutting and polishing.



Figure 1: Sample of rubies from Montepuez, northern Mozambique. Photo: Wimon Manorotkul.

Attracted by the great possibility of Mozambique becoming a new and sizable ruby supplier, and with the aim of developing a better trade relationship between the two countries, Thailand's Ministry of Commerce sent delegates from their Sub-committee for Gem Material Searching and International Relationship, along with a representative from GIT to

visit Pemba and Montepuez in Cabo Delgado during September 22–24, 2009. Mr. Fernando Thomas Natal, the district governor and his delegates met with the Thai representatives to discuss rules and regulations and other obstacles facing Thai gem dealers who have been trying to acquire gems in a legal fashion.

The potential ruby-rich area near Montepuez covers around 100 km². In addition to locals, many Tanzanian gem miners and traders have also moved into the area, particularly around Nanhupo market in the town of Montepuez—some illegally, according to Mr. Natal, which added more headaches to an already complicated problem. This forced the Mozambique government to clear the area of illegal miners and traders in an attempt to provide better security and control of the area by rezoning and issuing legal mining concessions to all miners, big or small. Later, in December 2009, Vincent Pardieu of GIA reported visiting the mining villages of Namahumbire and Namahaca about 30 km. east of Montepuez. He also reported that the government had granted mining licenses to a Pemba based company to operate in the south of Namahumbire village (Pardieu, V., 2009).

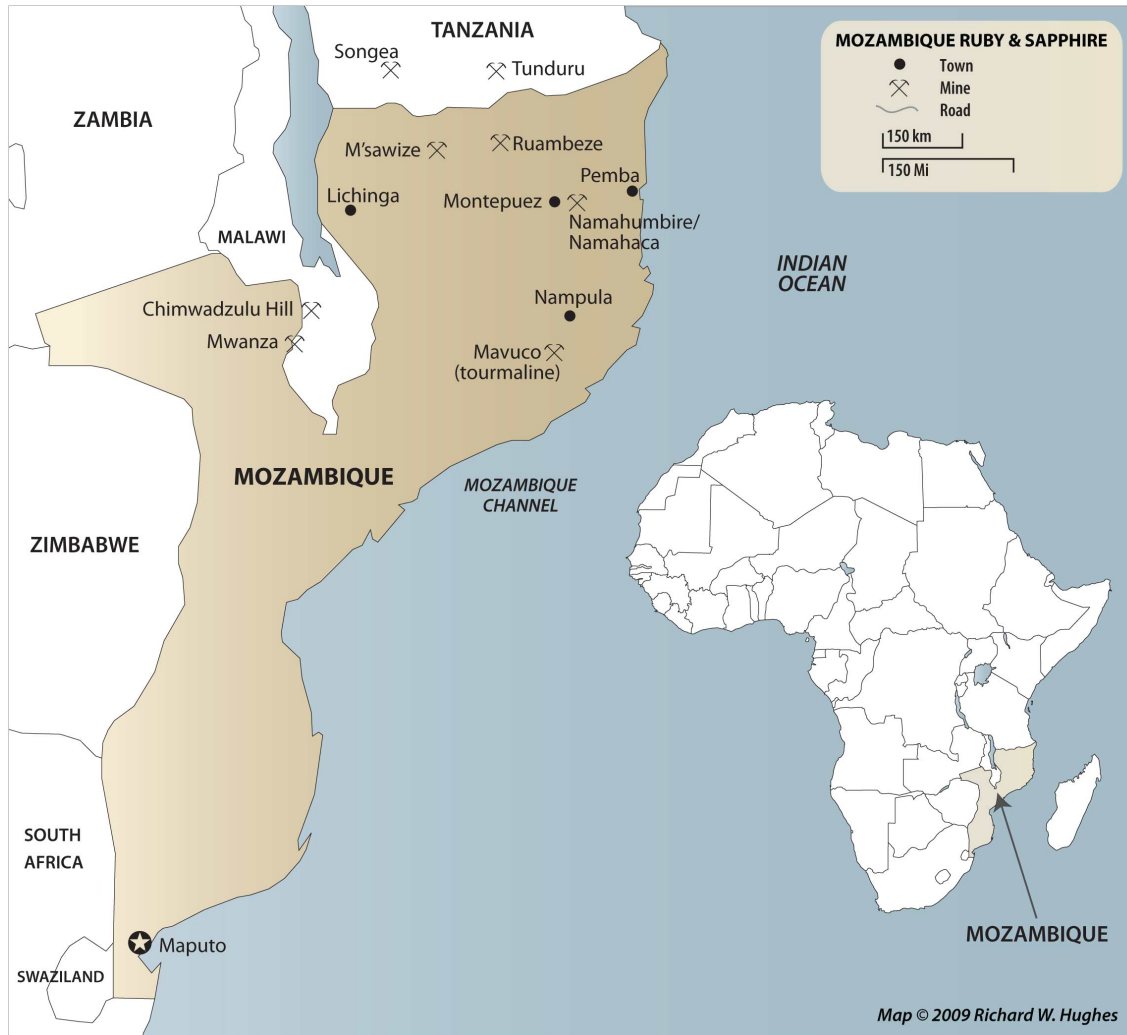


Figure 2: Map showing ruby deposits in northern Mozambique. Illustration © Richard Hughes.



Figure 3: Mr. Natal, Montepuez district governor (center) with the Thai delegates visiting a potential area of ruby deposit zoned by the government for mining concessions. Photo: Chakkaphan Sutthirat



Figure 4: Tanzanian gem traders at Nanhupo market near the mining area of Montepuez. Photo: Chakkaphan Sutthirat

Large quantities of ruby regularly change hands in the Nanhupo market and some are carried to Pemba and sold to Thai dealers. These rubies have a wide range of qualities, but the majority of them need some kind of enhancement, including flux-assisted heat-treatment and lead-glass filling enhancements (see Figure 5).



Figure 5: Sample of material that can be used for lead-glass fracture-filled treatment.
Photo: Chakkaphan Sutthirat

While visiting the area, the Thai delegation was presented with two remarkable ruby specimens from Montepuez by Thai traders. One was a 15-cm aggregate ruby with embedded green amphibole. The other piece was a 7-cm fragment of a hexagonal single crystal (see Figure 6). These two samples show similar appearances and characteristics to stones GIT-GTL previously acquired in March of 2009 that were believed to be of Mozambique origin. Their colors range from red to purplish red (comparable to Burmese rubies); however their mineral inclusions and chemical fingerprints are rather different. Microscopic examination shows pronounced lamellar twinning, mineral inclusions of amphibole, plagioclase (anorthite) and rutile. The amphibole in the aggregate specimen was later identified as actinolite and white feldspar in some samples appears to be anorthite as identified by Raman spectroscopy (see Figure 7 and 8). Figure 9 compares the chemical analysis of metamorphic rubies from different localities.



Figure 6: Two large ruby specimens presented to the GIT by Thai gem dealers doing business in Mozambique. On the left is an aggregate ruby with embedded green amphibole 15 inches–long. On the right is a single crystal showing two-thirds part of a complete hexagonal form (six faces). Photo: Chakkaphan Sutthirat

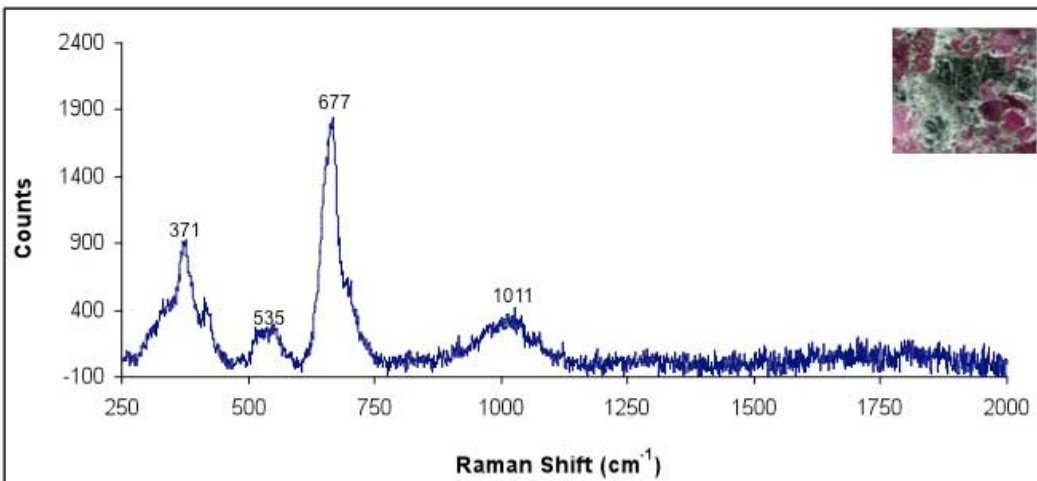


Figure 7: Raman spectrogram showing the character of amphibole (actinolite) associated with ruby aggregate.

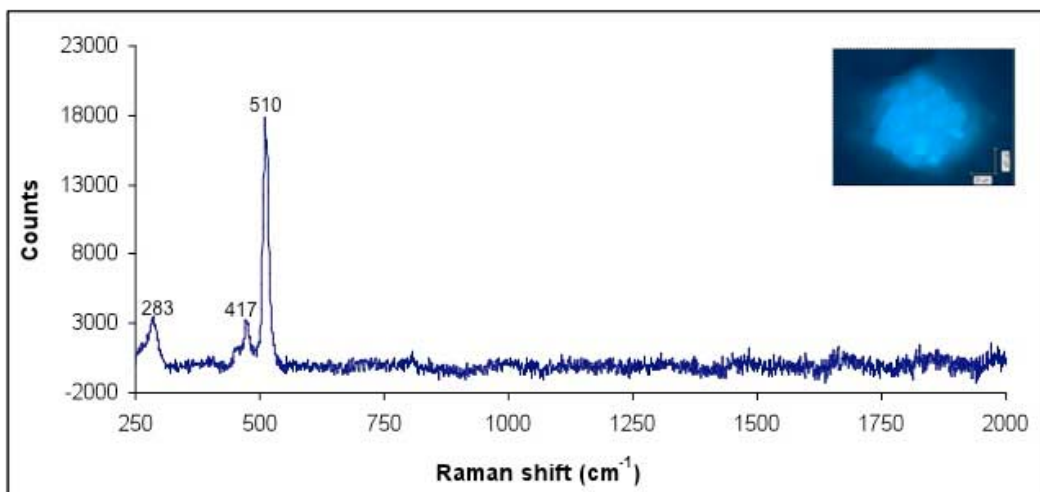


Figure 8: Raman spectrogram of white feldspar (anorthite) in one of the samples.

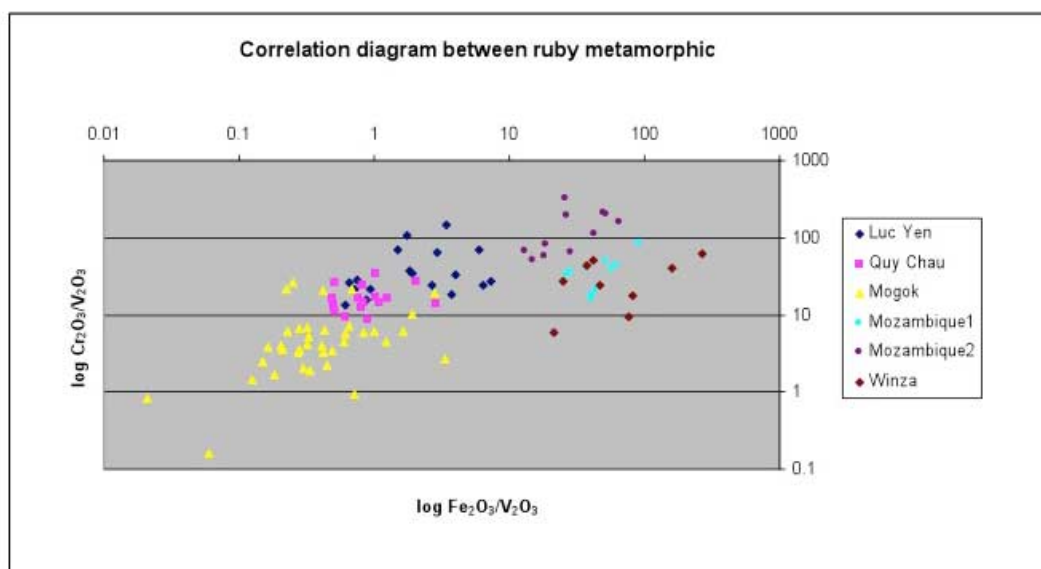


Figure 9: Chemical fingerprints obtained from different metamorphic rubies from different deposits, i.e., Luc Yen and Quy Chau in Vietnam; Mogok, Burma; Lichinga and Montepuez, Mozambique; and Winza, Tanzania.

Mozambique then and now

Gaining its independence from Portugal in 1975 after almost 500 years of colonization, Mozambique has been battered yet by another war. In the 1977–1992 civil war, the Liberation Front of Mozambique (FRELIMO) fought with rebel Mozambique National Resistance (RENAMO) and killed a million people and millions more fled their home to take refuge in neighboring states or were displaced inside the country (BBC News- *One-minute World News*, 2009). A peace agreement brokered by Christian groups and the United Nations ended the conflict in October 1992. In 1994 the FRELIMO party won its first democratic elections and remains the ruling party despite continued political unrest. Last October, President Armando Guebuza of FRELIMO was re-elected to his office. Economic reform and foreign aid helped Mozambique make a remarkable rebound from brutal civil war and severe flooding in 2000 and 2001 but 70% of the population still lives under the poverty line.

Nevertheless, Mozambique today is still seen by many as one of Africa's rising stars. In the past decade, the country's economy has seen an average annual growth rate of 9% (CIA-*The World Factbook*, 2010), one of the strongest on the continent. Foreign investors are showing an interest to tap into its oil, natural gas reserves, and other minerals. Gem dealers around the world are excited about their relatively new gem source. The country has a lot to offer. Its exports include, for example, seafood, agricultural products, minerals, and natural gas for example.



Figure 10: Other than gems, Mozambique has a lot more to offer, ranging from fine agricultural produce to healthy seafood and a spectacular beach. Photo: © Richard Hughes

Located on the southeast coast of Africa, Mozambique boasts pristine beaches just begging for tourists and investors. After years of fighting for independence and then a terrible civil war, the country is now ready for business and infrastructure development. Its government welcomes foreign investment and its people are enthusiastic and friendly. The country has more to offer than just rubies and we hope Thailand and Mozambique can work together to develop a closer relationship for the mutual benefit of each nation.

References

- BBC NEWS, (Nov. 11, 2009) Mozambique country profile
http://news.bbc.co.uk/mozambique/country_profile
 CIA–The World Factbook, (Jan. 21, 2010) Mozambique
<https://www.cia.gov/library/publications/the-world-factbook/geos/mz.html>
 Pardieu, V, *et al.* (2009) Expedition to the Ruby Mining Sites in Northern Mozambique
<http://www.gia.edu/research-resources/news-from-research/fieldtrip-to-mozambique-rubies.pdf>

Bibliography

- AllAfrica (2009) Mozambique: Government Concerned About Illegal Mining
<http://allafrica.com/mozambique.html>
 GIT, (2009) Some Characteristics of Mozambique Ruby
http://www.git.or.th/eng/testing_center_en/lab_notes_en/2009/GIT_article_ruby_mozambique_web.pdf
 Kawano, J. *et al.*, (2009) New Geological Origin: Ruby from Mozambique, *Gemmology*, 40.483, 13-15
 Koivula, J. I. and Johnson, M. L. (1996) Garnets from Mozambique, *Gems and Gemology*, 32. 2. 131
 Laurs, B. M., Zwaan, J.C., Breeding, C.M., Simmons, W.B., Beaton, D., Rijdsdijk, K.F., Befi, R., Falster, A.U. (2008) Copper-bearing (Paraiba-type) tourmaline from Mozambique *Gems & Gemology*, 44. 1. 4-30

McClure, S. F., Koivula, J.I. (2009) Preliminary Observations on New Rubies from Mozambique, *Gems & Gemology*, 45 .3. 224-225
Yager, T. R. (2007), The mineral industry of Mozambique 2006,
<http://minerals.usgs.gov/minerals/pubs/country/2006/myb3-2006-mz.pdf>