GIT Lab Alert

"Flux grown synthetic Ruby with high iron content

sold as Winza Ruby"

27th October 2010

GIT_GTL received a 6.02 ct ruby claimed to be "unheated Winza ruby" (Figure 1).

Figure 1: A 6.02 ct ruby claimed to be "unheated Winza ruby" (Dark field)

Microscopic observation reveals that distinct inclusions are hazy yellowish wispy veil-like fingerprints, cloudy pattern oriented along growth

zoning and yellowish inclusions (Figures 2 -3). The stone fluoresces strong red under LWUV but patchily chalky orange under SWUV . Hence, based simply on such inclusion features and fluorescent characteristics, this stone seems to be a synthetic ruby.

As a routine procedure in our lab, the chemical analysis by EDXRF is always carried out in order to check the contents of iron and gallium which are usually expected to be very low in the case of synthetic ruby. Surprisingly, however, we detected rather high content of iron (0.133% wt. oxide) and significant content of gallium (0.013% wt. oxide) while very low titanium contents (0.003% wt oxide) and vanadium (below detection limit). In fact, the contents of both iron and gallium at these levels are commonly fall in range of natural ruby. Unfortunately, LA-ICP-MS analysis has not been carried out on this stone yet because the client can no longer leave the stone with us. *Interestingly, nonetheless, point analyses on an exposed yellowish inclusion and brownish cloudy area revealed lead and bismuth as major elemental composition of the inclusion. The presences of both lead and bismuth in the inclusion and cloudy area are very strong evidence to indicate that this stone is originated from a synthetic flux-grown process. Further analysis by X-radiography also revealed the x-ray opaque areas are conform with position of yellowish inclusions and wispy-viel like fingerprints.*

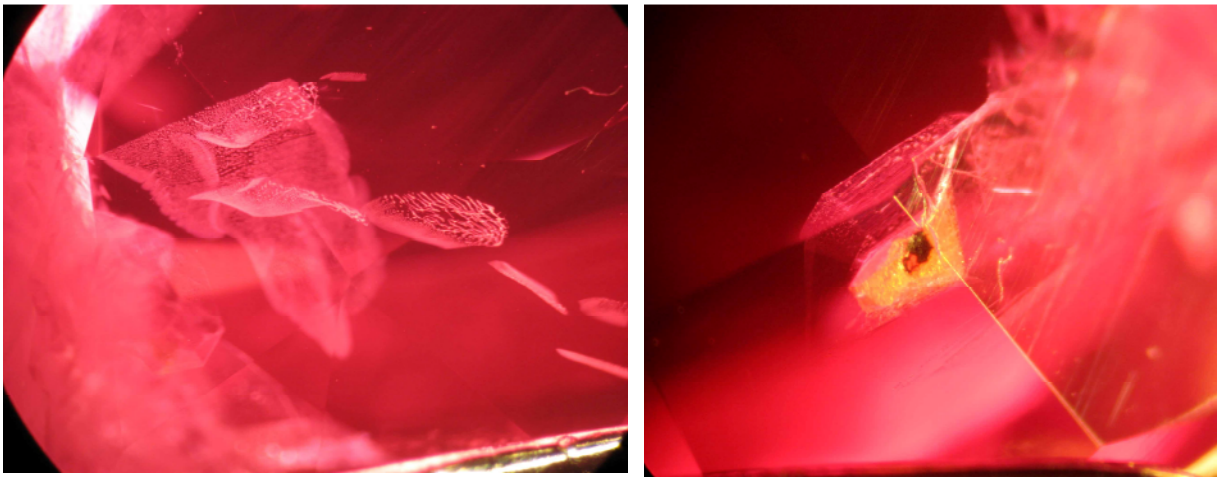

Figure 2: Hazy yellowish wispy veil-like fingerprints (left) and exposed yellowish inclusions (right).

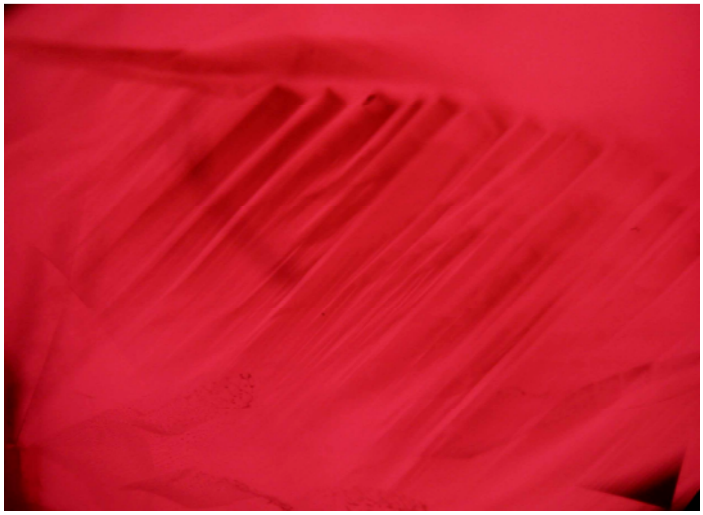

Figure 3: Brownish cloud pattern along growth zone on table.

Another surprise to us is the fact that the UV-Vis-NIR spectra measured from this stone show no iron related peaks which usually present at 450, 377 and 387 nm (Figure 4). Also the fluorescence image under DiamondView reveals highly unusual strong chalky flurescence and appears to be quite conformable with cloudy pattern (Figure 5).

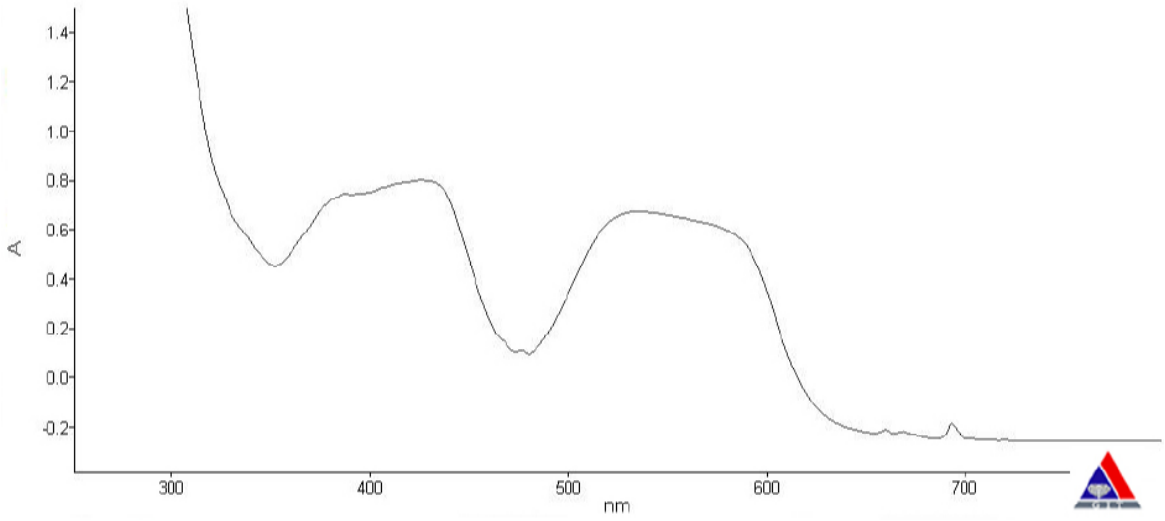

Figure 4: Represent UV-Vis-NIR spectrum of this stone .

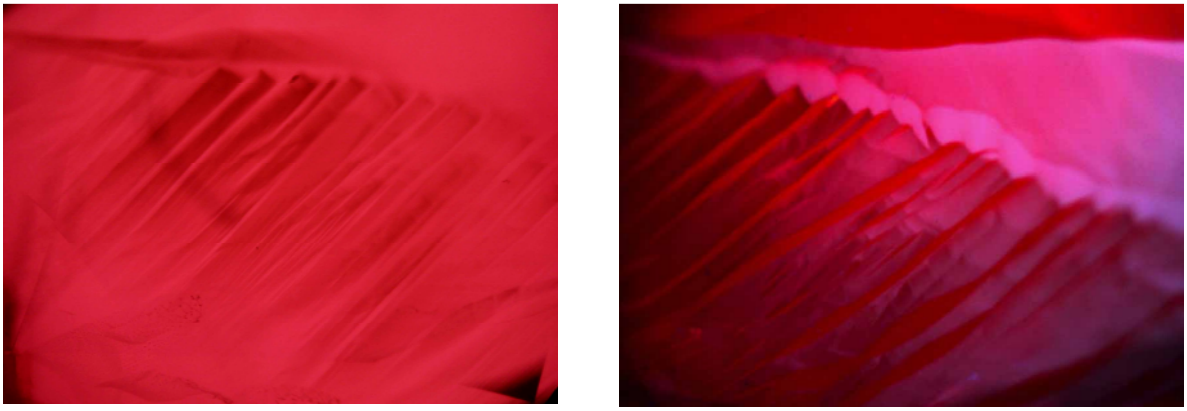

Figure 5 Brownish cloudy pattern appeared under a normal gem microscope (left) and DiamondView fluorescence image of the same area (right)

In conclusion, based on its inclusion aspects, unusual SWUV fluorescence and chemical composition of the inclusions, we are strongly convinced that this stone is a flux-grown synthetic ruby. However, the most interesting point of this story is that the stone was sold to our client as "unheated Winza ruby", but **if this stone is lack of inclusions or inclusion free and the chemical compositions give significant contents of both iron and gallium, and low to very low titanium and vanadium content, it can be misled to identify this stone as a natural ruby. Particularly for the stones from new deposits in Tanzania and Mozambique, they usually contain a range of chemical composition similar to this synthetic ruby.**

By GIT Gem Testing Laboratory