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TRADE ALERT

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Kashmir-like' sapphires from Madagascar entering the gem trade in large sizes and quantities

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In recent weeks, the Swiss Gemmological Institute SSEF has analysed a significant number of sapphires from a new deposit at Bemainty, near the small town of Ambatondrazaka in Madagascar, which were submitted to us by several reliable independent sources. Bemainty/Ambatondrazaka is the site of a new gem-rush in Madagascar, which over the past few months has produced an impressive amount of sapphires, fancy coloured sapphires, and padparadschas of partly exceptional size and quality (Krzemnicki 2017 *in SSEF Facette* www.ssef.ch/research-publications/facette/ and upcoming *Journal of Gemmology*, Perkins 2016, Perkins & Pardieu 2016, Pardieu et al. 2017), and it appears to be a new gem source of greater importance than anything we have seen in recent years.

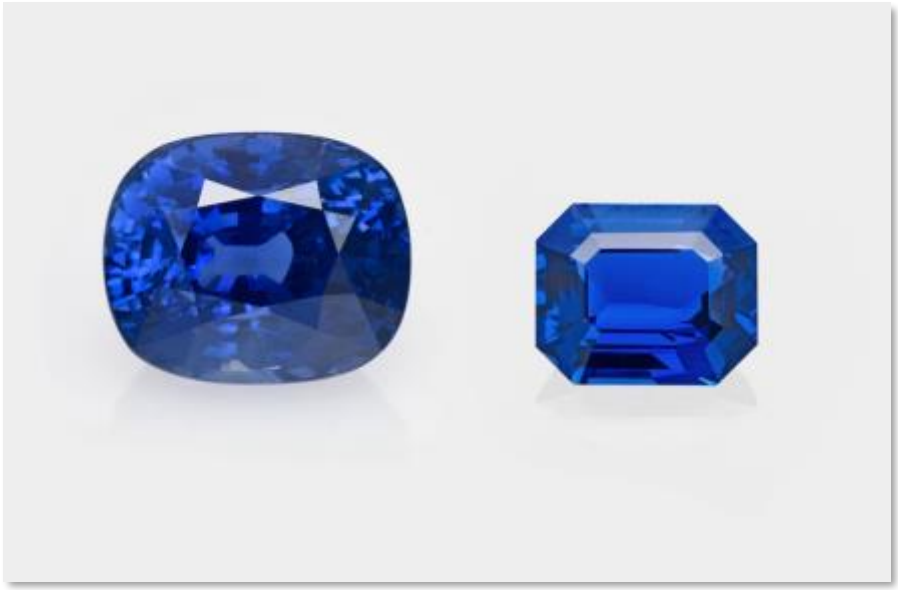

Figure 1: 'Kashmir-like' sapphires of exceptional quality and size (left 30 ct, right 13 ct) from Bemainty near Ambatondrazaka in Madagascar. Photo: SSEF

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This Trade Alert focuses on sapphires from this new source in Madagascar which have a **'Kashmir-like' visual appearance.** They are characterised by a subtle and fine milkiness, which results in a velvety blue colour typical of top-quality Kashmir sapphires.

Unfortunately, many of these new sapphires are accompanied by gemmological reports describing them as being of Kashmir origin. Having recently tested a sizeable number of such 'Kashmir-like' sapphires submitted by clients, and ranging in weight from 5 to 50 cts, we have concluded that many of these gems of so-called Kashmir origin actually originated from the new deposit near Bemainty/Ambatondrazaka in Madagascar. Our findings are based on meticulous microscopic observations, and also on an array of sophisticated scientific methods, including Raman microspectrometry, UV-Vis absorption spectrosopy, X-ray fluorescence and GemTOF (laser ablation inductively coupled plasma time-of-flight mass spectrometry) for trace element concentration (see also www.gemtof.ch and Wang et al. 2016).

The arrival of large quantities of new sapphires of Kashmir-like appearance is challenging for the gem market and gemmological laboratories alike, especially as we know that some of these Madagascar sapphires are being purposely introduced into the gem market with fraudulent claims of historic Kashmir provenance.

How can these new sapphires be distinguished from Kashmir sapphires?

The new sapphires from Madagascar can, to a great extent, be distinguished from Kashmir sapphires by careful microscopic observation. In combination with advanced methods such as trace element detection (eg. GemTOF) and Raman microspectrometry, further evidence can be collected to be able to confirm their origin.

Under the microscope (or loupe), the new 'Kashmir-like' sapphires from Madagascar often show an exceptional clarity (apart from a general milkiness), very much in contrast to sapphires from Kashmir, which often contain tiny but frequent inclusions of different kinds (pargasite, tourmaline, feldspar, uraninite), especially in stones above 10 cts. The new material from Madagascar often shows dense and narrow growth zones, compared to much more blocky three-dimensional growth zones in Kashmir sapphires (Figure 2), but to date has never shown the iconic pargasite and tourmaline inclusions that are highly characteristic of Kashmir sapphires.

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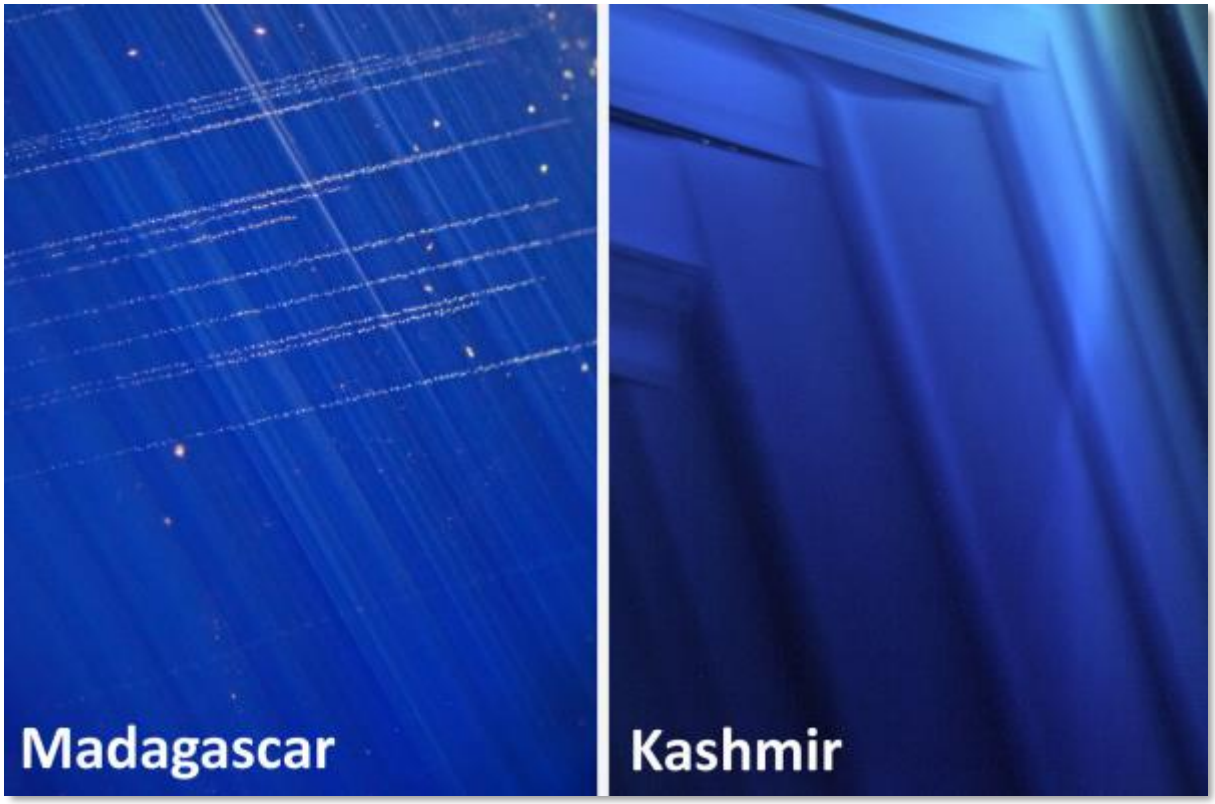

Figure 2: Dense zoning of new sapphires from Madagascar (left) compared with characteristic blocky zoning (parquet structure) of classic Kashmir sapphires (right). Photos: M.S. Krzemnicki, SSEF

Occasionally, the new sapphires from Madagascar show a marked chromium concentration, resulting in larger purplish zones with a diffuse outline within the sapphire. This zoning feature is greatly in contrast with those found in Kashmir sapphires. In fact, Kashmir sapphires may show very thin and well-defined growth layers enriched in chromium, and are only visible when exposed directly to a strong light source, as reddish visible fluorescent layers (see Figure 3). Kashmir sapphires do not, however, show diffuse purplish colour zones under normal light.

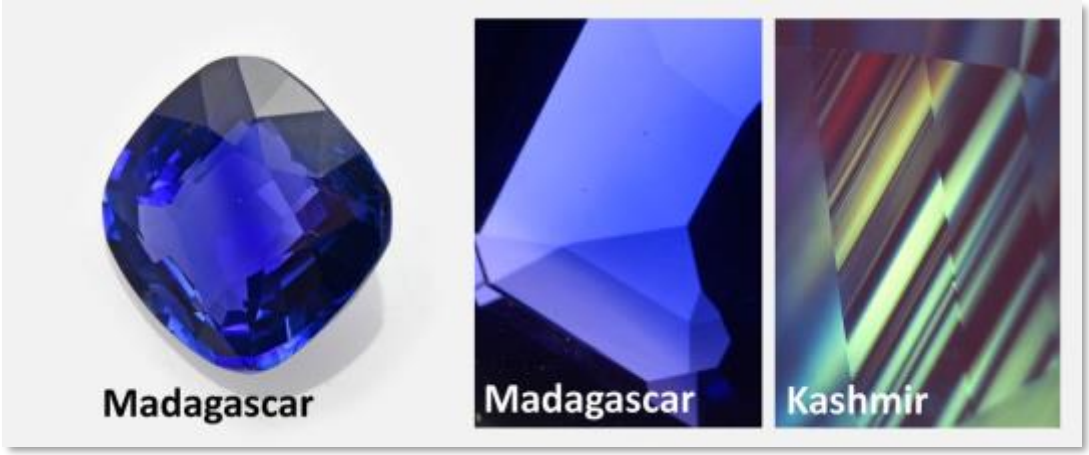

Figure 3: Diffuse purple colour zone (chromium enriched) occasionally seen in new sapphires from Madagascar (left) compared to fine narrow growth layers with red visible fluorescence (due to chromium) in Kashmir sapphire. Photos: SSEF and H.A. Hänni, SSEF.

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The new ‘Kashmir-like’ sapphires from Madagascar may show fine dust lines and tracks and flakes (Figure 4), which are to some extent reminiscent of similar structures in Kashmir sapphires. However, we would like to remind readers that similar structures have also been described in ‘Kashmir-like’ sapphires from Sri Lanka and Andranondambo (SE-Madagascar). Therefore, these features are only of limited use to identify the origin of a sapphire.

Figure 4: Dust tracks in one of the new ‘Kashmir-like’ sapphires from Madagascar. Photo: M.S. Krzemnicki, SSEF

However, the most challenging feature is that these new sapphires from Madagascar often contain tiny prismatic zircon crystals, somewhat similar to those seen in Kashmir sapphires. The zircons in the Madagascar stones are rather metamict, very much in contrast to zircons in sapphires from Kashmir.

The UV-Vis absorption spectrum of the new ‘Kashmir-like’ sapphires from Madagascar is very similar to the ones of Kashmir sapphires. It is mainly characterised by absorption features in the UV range related to their milkiness, and a small peak at 450 nm due to a low concentration of ferric iron (Fe^{3+}).

Finally, it is possible to further separate these new Madagascar sapphires from Kashmir sapphires on the basis of their trace element chemistry, readily analysed with the GemTOF instrument at SSEF. This highly sophisticated instrument allows us to quantify chemical elements and isotopes even at sub-trace levels (ppb).

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What measures can be taken to protect the trade?

As a world leading gemmological laboratory, the Swiss Gemmological Institute SSEF has analysed in recent years several of the most prestigious gemstones offered in the trade, including several exceptional sapphires from Kashmir that have shown classical inclusion characteristics described in detail by Gübelin & Koivula (1986 and 2008), Hänni (1990), Schwieger (1990) and Krzemnicki (2013).

With the sudden arrival at SSEF of similar looking sapphires from Madagascar in the range of 5 to 50 cts in recent weeks, we immediately initiated research and have finally succeeded in establishing stringent criteria to identify this new material and to distinguish it from Kashmir sapphires, when characteristic features permit this. This work is based on decades of experience in origin determination, state-of-the-art analytical instrumentation, and an extensive reference collection that is constantly upgraded with gemstones from new deposits, such as the described new sapphires from Madagascar.

The arrival of these new sapphires from the gemstone rush at Bemainty/Ambatondrazaka has great potential and should be an asset to the gem trade, as long as the true origin of these gemstones is correctly disclosed throughout the supply chain. It only becomes challenging or a threat to the trade when these sapphires are wrongly labelled, for example as Kashmir sapphires, and sold as such within the trade and finally to the consumer.

With this alert, we want to inform the trade about this new gem source of 'Kashmir-like' sapphires in Madagascar and raise awareness of the challenge they pose to the trade, which may have considerable financial and reputational impact if they are not properly disclosed.

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