



An Update on Paraíba Tourmaline

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At the end of the 1980s, unusual vivid blue and green elbaite tourmalines from the Paraíba State in northeastern Brazil generated major interest in the gem trade due to the discovery of exceptionally coloured varieties that had never been seen before in this gemstone species.

It was the first time that the trace element copper together with variable amounts of manganese was reported as a colouring agent in this species of gemstone (Bank et al., 1990; Fritsch et al., 1990). To separate these unique tourmalines from all other gem tourmalines they were commonly referred to as “Paraíba tourmaline” (Fig. 1). In just a few decades, they have developed to one of the most valuable and sought-after gems in the world.



Fig. 1 Faceted Paraíba tourmaline from Brazil weighing approx. 3 ct.

Paraíba tourmalines do not only occur in the now legendary Batalha pegmatites in Paraíba but are also found in the neighbouring Rio Grande do Norte State. The tourmaline-bearing pegmatites occur in metamorphic rocks of the Brasiliano orogeny, a large scale mountain building process that occurred approximately 650 to 500 million years ago and also effected large parts of the African continent. At the turn of the millennium, copper and manganese bearing tourmalines were actually found in the Oyo state in Nigeria. Today most copper bearing tourmalines offered on the market come from alluvial deposits in the east part of the Alto Ligonha pegmatite area in northeastern Mozambique. These discoveries have led to considerable debates regarding the appropriate use of the term Paraíba tourmaline. In addition, the African occurrences also produce iron-rich cuprian tourmalines (Fig. 2) which opens up additional nomenclature considerations.

Copper and manganese bearing tourmalines from all deposits can have their colour modified or changed through heat treatment at relatively moderate temperatures in the range between approximately 500°C and 600°C. Commercially most important is the change from purple, violet and dark blue to turquoise coloured specimens.

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Fig. 2 Faceted iron-rich cuprian tourmaline from Mozambique weighing approx. 10 ct.

The degree of colour change strongly depends on the trace element content and the absorption spectra of the precursor material. Measured absorption spectra and calculated Cu/Mn band ratios indicate whether a tourmaline is heat-treatable or not. Stones without copper or very low copper to manganese ratios will turn colourless or near colourless after being heated.

With the decline of high-quality material and an increasing production of included and fractured material, increasing amounts of clarity enhanced material appeared on the market.

This presentation will focus on the origin, nomenclature and enhancement of Paraiba tourmaline.

References

Bank, H., Henn, U., Bank, F., v. Platen, H., Hofmeister, W (1990): Z. Dt. Gemmol. Ges. 39, 1, 3-11.

Fritsch, E., Shigley, J.E., Rossman, G.R., Mercer, M.E., Muhlmeister, S.M., Moon, M. (1990): Gems & Gemology 26, 189-205.

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