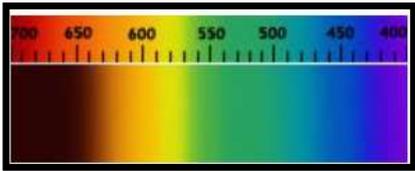


**Warning: this version has been completed with Google Translate , it certainly contains errors or inaccuracies.**

## Technical details - general: **Tourmaline - Paraiba**

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| <b>Gemma - names</b>      | ( <b>Italian</b> - Paraiba)<br>( <b>English</b> - Paraiba)<br>( <b>French</b> - Paraiba)<br>( <b>Spanish</b> - Paraiba)<br>( <b>Portuguese</b> - - Paraiba)<br>( <b>Thai</b> - - พาราอิบา ทัวร์มาลีน<br>Phā rā xi bā th ā wr ' m ā lī n )  | ( <b>German</b> - Paraiba)<br>( <b>Arabic</b> - بارايبا barayba )<br>( <b>Russian</b> - Параиба Paraiba)<br>( <b>Mandarin</b> -帕拉伊巴 Pàlāyībā )<br>( <b>Swahili</b> - - Paraiba)<br>( <b>Hindi</b> - - पैराइबा टूरमलाइन pairaiba toomalain ) | <b>photo</b><br>   |
| <b>Colors (GIA)</b>       | Colors must be intense or "electric": typically <b>mint green</b> (sometimes even <b>yellowish</b> ) to <b>sky blue</b> , <b>sapphire blue</b> , from <b>purple</b> to <b>purplish</b> . The saturation level should range from <b>4, "Moderately strong"</b> to <b>6, "Vivid"</b> . The tones range from light medium to dark medium.   |   |   |
| <b>Cause of Color</b>     | Generally elements of iron, manganese, chromium and vanadium are responsible for the various colors of tourmalines. But Paraiba (tourmalines) owe their vivid color to the <b>presence of copper</b> (Cu <sup>2+</sup> ) and <b>manganese</b> (Mn <sup>3+</sup> ) . Sometimes <b>the indicolite</b> , another variety of tourmaline, can have a similar color, but in the case of the latter the main chromatophore is <b>iron</b> (Fe <sup>2+</sup> in octahedral coordination. Green may be due to the presence of Fe <sup>2+</sup> and Ti <sup>4+</sup> in octahedral coordination. |   |   |
| <b>Classification</b>     | <b>Mineral class</b><br>Cyclosilicates   | <b>Species - Group</b><br>Elbaite - Tourmaline  | <b>Variety</b><br>Blue with copper impurities   |
| <b>Market names</b>       | Paraiba - paraiba tourmaline - "Paraiba type" tourmaline (for non-Brazilian varieties of elbaite)  |   |   |
| <b>Optical properties</b> | <b>Specific Gravity:</b><br><b>3.04 to 3.13</b><br>common  | <b>RI:</b> 1,618 to 1,643<br><b>Polariscope</b> :DR<br><b>Double refraction:</b> 0.018 to 0.021   | <b>Character optical</b><br>Negative uniaxial   |
|                           | <b>Luster (luster) - luster of the fracture</b><br>Vitreous, sometimes resinous -  |   | <b>Pleochroism</b><br>Typically moderate to strong: dark blue, light blue   |
| <b>Light</b>              | <b>Fluorescence</b><br>SWUV: inert (tenuous-rare)<br>LWUV: inert (tenuous-rare)  |   | <b>Dispersion (fire)</b><br>0.017   |
|                           | <b>Phosphorescence</b><br>No   |   |   |
| <b>Form</b>               | <b>Crystalline dress</b><br>Parallel and elongated. Acicular prisms, sometimes radiating. Massive. Scattered grains (in granite).  | <b>Phenomenal optical effects</b><br>Catitude, 4-ray asterism (rare, paraiba rarely receive cabochon cuts); some specimens may show a <b>change in color</b> .  | <b>Crystalline system</b><br>Trigonal   |
|                           | <b>Crystal class</b>   |   |   |
| <b>Chemical formula</b>   | N / A<br><br>$\text{Na ( Li}_{1.5} \text{ Al}_{1.5} ) \text{ Al}_6 (\text{Si}_6 \text{ O}_{18} ) (\text{BO}_3)_3 (\text{OH})_3 (\text{OH})$  |   | <b>Spectrometer image</b><br><br>Wide absorption band above 630 nm |
| <b>Fracture</b>           | <b>Flaking</b><br>Indistinct (in 2 directions)   | <b>Breaking- Parting</b><br>No  | <b>Fracture</b><br>Conchoidal, irregular  |
| <b>Durability</b>         | <b>Hardness (Mohs); Absolute</b><br>7 - 7.5; 100-150   | <b>Toughness</b><br>Discreet-fragile  | <b>Stability</b> (heat, light, chemicals)<br>Discreet, it reacts to heat  |

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| <p><b>Clarity - characteristics</b></p>       | <p><b>Typical</b> Inclusions: Two-phase gas-liquid inclusions, healed fractures, "feathers", platelet-like native copper inclusions, tenorite (Brazil) hexagonal mica crystals (Nigeria), yellowish-brown filaments / growth tubes (Nigeria) , needles (Mozambique) and tiny crystals. For Paraiba tourmaline, the most important factor is color. Clarity has less impact on its value.</p>  |   |
|   | <p><b>Type II</b><br/>Normally included</p>   | <p><b>Transparency (commercial) - transparency</b><br/>Translucent to transparent</p> |
| <p><b>Deposits - types of rocks</b></p>       | <p>Tourmaline is most commonly found as an accessory mineral in metamorphic (crystalline schists) and igneous (granites) rocks, particularly in granite <b>pegmatites</b> (especially elbaite). Large, well-formed tourmaline crystals can also form in cavities and fractures during hydrothermal activity. African paraiba tourmalines are also found in alluvial deposits of altered host rock.<br/><b>Age</b> : 500-600 million years</p>   |   |
| <p><b>Characteristics of rough stones</b></p> | <p>Tourmaline (in general, including Paraiba) has a prismatic crystalline habit and often has <b>evident streaks parallel</b> to the long axis of a crystal. Elongated tourmaline crystals often have triangular or hexagonal cross sections with rounded edges.</p>  |   |
| <p><b>Main Deposits Countries (since)</b></p> | <p>Original: from <b>Brazil only</b> (Paraíba, Salgadinho , São José da Batalha), Market alternatives (often with the same name and normally dealt with): <b>Mozambique</b> ( Mavuco , Nampula province), <b>Nigeria</b> ( Edeko area , Ibadan state, Nigeria SO, State of Oyo ).</p>   |   |
| <p><b>Year of discovery</b></p>               | <p><b>1989:</b> Paraiba tourmaline was first discovered in 1989 in Brazil (other sources place 1987 as the year of the first identification). The discovery was the crowning glory of Heitor Barbosa, a Brazilian geologist who had focused his exploration efforts in a region that was previously not known for its minerals.</p>   |   |
| <p><b>History</b></p>                         | <p>The earliest known deposit was called <b>the Batalha mine</b> and is believed to have produced the best paraiba tourmaline crystals in the world . While the Batalha mine still produces a minimal amount of low to medium quality gems, the finest specimens were mined until the mid-1990s. When the material first hit the market at the <i>Tucson Gem Shows</i> in 1990, it immediately captured the attention of jewelers and collectors with its incredible vivid colors, never before seen in the world of natural gems. The gemological laboratories promptly tested a sister of Rubellite, Indicolite and liddicoatite . Elbaite is normally achromatic, i.e. colorless unless trace elements are present in the chemical formula. In the case of Paraiba Tourmaline, the crystals contain traces of copper (sometimes along with gold) which give the crystals their unique color. GIA, AGTA and other important associations adopted the technical name of "<i>Tourmaline Elbaite Cupriana</i> ", however jewelers, auction houses and collectors continue to use the term "<i>paraiba tourmaline</i>", or simply "<i>paraiba</i>" .<br/><b>Name:</b> Elbaite takes its name from the island of Elba, in Italy, where it was first identified in 1913. It includes some other varieties as well as paraiba:<br/>Colorless: acroite variety<br/>Red or rosy-red: rubellite variety<br/>Light blue to bluish green: indicolite variety<br/>Green: verdelite variety<br/>Of various colors: the "watermelon / watermelon " tourmaline<br/>The term Paraiba instead derives from the state of <b>Paraíba</b> , in Brazil.</p> |   |
| <p><b>Property attributed</b></p>             | <p>Paraiba tourmaline appears as a non-secular gemstone that brings <b>positivity, peace and a sense of fulfillment</b>. Refine the intuition and creative and intellectual abilities of the wearer and allows you to postpone bad perceptions.<br/>Promotes emotional recovery (helps the person recover from unpleasant memories and update them with new ideas). It also helps those who are overburdened with obligations and encourages private duty. It is also a "stone of truth". Its vibrations do not allow you to cheat or lie. It supports meditation and religious vision. It improves the metabolism and the immune system. It also has a good effect on the wearer's throat, eyes, enamel, jaw, hormone production, critical organs and bones. Like all blue or bluish stones, Paraiba</p>   |   |



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|                                     | <p>Tourmaline is an excellent crystalline ally for writers, teachers, scholars, speakers and consultants.<br/> It is the gem of the <b>8th wedding anniversary</b> (tourmalines in general).<br/> <b>Planet:</b> Venus<br/> <b>Month:</b> October <b>Zodiac sign:</b> Gemini (with other blue stones) and Libra<br/> <b>Chakra:</b> Throat</p>   |  |   |
| <b>Treatments</b>                   | <p><b>The color</b> is often enhanced or changed through heat treatment, which typically causes the stone to change color: from a purplish violet to a deep blue-green. The temperature used is normally <b>between 500 ° C and 650 ° C ( for 3-6 hours</b>, but sometimes even longer), i.e. between <b>450 ° C</b>, a quantity of heat lower than that at which the oxidation of Fe<sub>2</sub> and Mn<sub>2</sub> and <b>700 ° C takes place</b>, the temperature at which a process of structural disintegration of tourmaline begins, whose melting point is estimated at <b>880-920 ° C</b>.<br/> <b>Clarity</b> : The transparency of the crystals can be changed by filling fractures / cavities and laser perforation. Although clarity does not play an important role in Paraíba's value, these gems can receive treatments to improve that aspect. For example, <b>lasers</b> can remove dark inclusions and <b>fillers</b> can reduce the visibility of surface fractures. However, stones with evidence of clarity treatments are less valuable on the market than untreated stones of similar quality. As a result, paraibas don't receive these treatments very often.</p> |  |   |
| <b>Synthetic counterpart</b>        | <p>There is no laboratory man-made version of Paraíba, however numerous man-made gemstones are on the market and are often promoted as synthetic Paraíba (although not): synthetic sapphire, spinel and beryllium, CZ (cubic zirconium) , glass, plastic.</p>  |  |   |
| <b>It can be confused with</b>      | <p>The Brazilian stones are the only ones to be called "Paraíba Tourmaline" and are also <b>those with the most intense color</b> . However, they recognized that the term "Paraíba" had been associated with copper / manganese-containing tourmaline and neon blue gemstones in general. For this reason, African stones can be called "Paraíba type tourmaline". This name is also often attributed to stones of similar color (indicolite for example), but they do not contain copper.<br/> Beware of imitations such as synthetic hydrothermal beryl, apatite and assembled gems. Topaz, aquamarine.<br/> <b>Indicolite</b> with high iron content. Verdelite (another variety of tourmaline which, as the name implies, is typically green)</p>   |  |   |
| <b>Indicative gemological tests</b> | <p>Gemological test standards such as:<br/> I can separate paraiba from its so-called simulants. To determine the price, however, as usual the mi<br/> Geographical origin can have a significant impact on the value of Paraíba tourmaline. Quantitative chemical analysis with LA-ICP-MS provides a reliable tool for origin determination. The trace elements Cu, Zn, Ga, Sr, Sn and Pb are the most useful discriminators for the origin of Paraíba tourmaline. Generally high content in Copper (Brazil), Strontium (Nigeria), Gallium-Zinc (Mozambique).</p>   |  |   |
| <b>Value (2021)</b>                 | <b>High:</b> \$ 100,000 / ct<br><b>3 carat +</b>   | <b>Medium:</b> \$ 5-10,000 / ct<br><b>1-3 carats</b> | <b>Low:</b> \$ 500 / ct (African)<br><b>below the carat</b> |
| <b>Typical cut</b>                  | <p>Due to the scarcity and stellar price of raw crystals, this gem is generally faceted with the intent of preserving maximum weight while still keeping an eye on its aesthetic value. In nature tourmaline crystals are <b>typically elongated</b> , as a result, they are cut into tremendously uncalibrated and unique shapes.</p>   |  |   |
| <b>Famous stones</b>                | <p>In 2013, the Kaufmann de Suisse jewelry house created an amazing and extravagant necklace (sold at the end of the following year) and called the "<b>Ocean Jewels ' Necklace</b> " using what has been designated as the largest cut Paraíba tourmaline in the world, a gem weighing <b>191.87 carats</b>. The modified oval brilliant-cut stone was set beneath a <b>10.73-carat yellow diamond</b>, along with 1,705 other brightly colored gemstones. The precious jewel is now owned by Vincent Boucher, CEO of <i>Billionaire Business Enterprises Inc.</i> The jewel appeared with the following sentence:<br/> <i>" The brilliant blue-green color of the stone is the symbol of our little blue planet, 70% covered by oceans, whose health is inextricably linked to ours "</i>,</p>   |  |   |
| <b>Record stones</b>                | <p><b>The largest:</b> The largest faceted Paraíba in the world (at <b>191.87 carats</b> ) is the one mentioned above, with its flawless neon blue color and almost unnatural optical transparency.<br/> <b>Most Expensive:</b> In 2018, a pair of 7.46-carat and 6.81-carat Paraíba tourmaline-decorated earrings, respectively, was purchased from a private bidder for <b>\$ 2.78 million or \$ 194.730 per carat</b> - a price of \$ 2.78 million per carat. auction record for this gem.</p>  |  |   |

