

MP² The MP² Research Group Abstracts



Gem Tourmaline From Nigeria

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In 1998-2000, alluvial deposits in the Ibadan area in western Nigeria provided a major source of gem tourmaline. A suite of 50 faceted stones from this region were analyzed by electron microprobe. The stones were loaned by Bill Larson (Pala International, Fallbrook, California) and Bill Barker (Barker & Co., Scottsdale, Arizona), and ranged in color from near colorless to pink, to pinkish orange to purplish red, red-orange, pale yellow to yellowish green and dark green, bluish green, and grayish blue. Seven of the stones were bicolored in pink/yellowish green, pink/near colorless, purplish red/near colorless, and pink/grayish blue. A second set of nine blue Nigerian faceted tourmalines from Philip Zahm Gemstones (Aptos, California) were also analyzed.

The results show that the majority of the stones are elbaite and liddicoatite in about equal proportions (Fig. 1). Notably, portions of two stones plot in the X-site-vacant field. These are the first confirmed samples of faceted rossmanite and the first reported rossmanite from Nigeria.

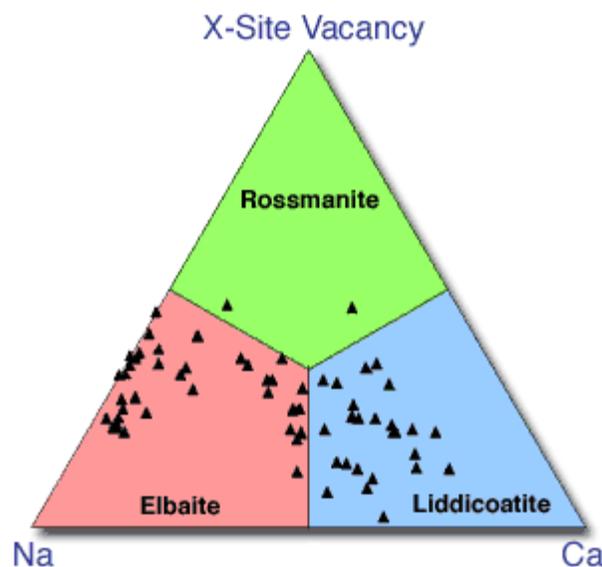


Figure 1: X-site Ca-□-Na ternary plot

Fe, Mn, and Ti are the principal chromophoric elements in these tourmalines; however Fe content is the dominant factor in determining color. As Y-site Fe increases, the colors change from pink/red to green and blue. The near-colorless to pink to red stones contain none to low quantities of Fe. Green and blue stones have higher Fe contents, a broad range of Mn, and in some cases higher Ti contents. Blue stones have the highest Fe content, a broad range of Mn and low Ti contents. Notably, no correlation between Mn content and the intensity of the pink/red color is observed (Fig. 2), suggesting that natural radiation which oxidizes Mn²⁺ to Mn³⁺ may be a critical factor in producing pink to red Li-Al tourmaline.

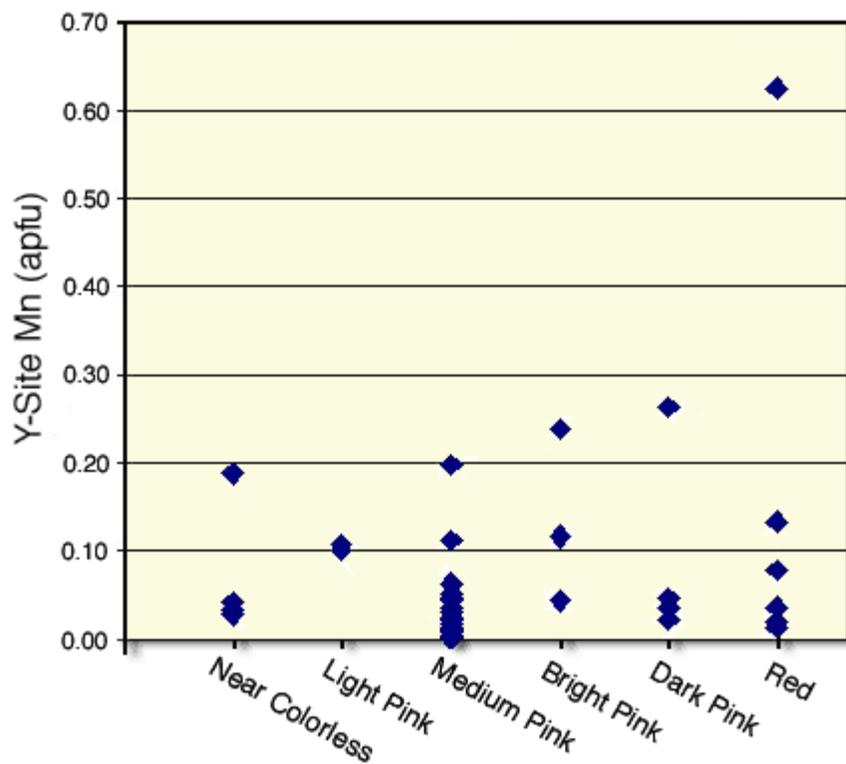


Figure 2: Near-colorless to pink to red color intensity vs. Y-site Mn (apfu).

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