

Implications of the Presence of Parisite and Bastnäesite for the Formation of Emeralds in the Western Margin of the Eastern Cordillera, Colombia

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Emeralds are the most widely recognized natural resource from Colombia. They are restricted to two areas in the Eastern Cordillera of Colombia, the eastern and the western margins of the belt, defined as the Eastern and Western emerald belts. Although many studies have been done in these areas to explain the origin of the emeralds, none of these have taken into account the presence of REE minerals, such as parisite or bastnäesite, as indicators of the conditions of formation of the ore.

Mineralogical studies shown that the parasite and emerald are in equilibrium, which indicates that these two minerals must share similar physiochemical conditions of formation. Using recently published thermodynamic data from Colombian parasites and geochemical analyses of the minerals in equilibrium with this mineralizing stage (i.e., parisite-fluorite and fluorite-bastnäesite), as well as applying scanning electron microscopy (SEM) and X-ray fluorescence (XRF) to polished thin sections and individual crystals, the fugacity of fluorine may be calculated. The high chemical activity of fluorine suggests that the mobilization of Be was a consequence of a fluorinated fluid as has been demonstrated in previous experimental work (e.g., for the Mananjary emerald deposits).

Nevertheless, these results are only valid for the Western emerald belt because these minerals are only found in this area. Moreover, there is an undeniable difference in age for deposits from the different areas.