

Emeralds from Jharkhand, India

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Extended Abstract

Background

It was December 2013, when the news about emerald deposits in the state of Jharkhand broke out in the market and within few months time, some large quantities of these emeralds were already being mined. The deposit initially attracted attention because of the reports in local media about arrests for illegal mining and smuggling. In no time, these emeralds became quite popular in the local market and many traders have shown interest in these stones. As per a report published in the Journal of Gem & Jewellery Industry, Vol. 51, No. 5, "over 5,000 skilled and unskilled miners are digging nearly 15 kg of precious stones (emerald) per day". Although, we have seen some large lots of Jharkhand emeralds, most of which are relatively small in sizes, less than 5 ct in rough.

Emerald deposits in Jharkhand are located in Ghorabandha hills in Ghatshila sub-division of East Singhbhum district, bordering the state of Odisha (Orissa), which is already known for a variety of high quality gemstones. Mining in Jharkhand is carried out by local villagers, including children in at least 50 places and hence is illegal at this stage. However, the government of Jharkhand is working towards legalizing mining by seeking necessary approvals from the centre for reserving the mining areas for Jharkhand State Mineral Development Corporation. Meanwhile, these emeralds are gaining popularity amongst the traders and jewellers in Jaipur and hence, we also procured and studied few samples of these emeralds.



Figure 1: Emerald rough from Jharkhand in a range of colour, transparency and size.

Visual Characteristics

The studied emeralds from Jharkhand displayed a range of colours from bluish green to yellowish green of medium to strong saturation (see figure 1 and 2).

However, most of these emeralds are characterized by haziness while many rough crystals appear blackish due to presence of some mineralic substance, making the stones appear opaque. Although, these can be removed during cutting and polishing, some still make their way into the cut stones, making them appear too dark or blackish.



Figure 2: Representative samples of cut and polished emeralds from Jharkhand. Note the difference of colour shade in two specimens.

Basic Properties

Gemmological properties namely, refractive index and specific gravity were measured at 1.580 - 1.588 and 2.70 - 2.71, respectively; displayed strong Cr-absorption in desk model spectroscope, and appeared inert under ultra-violet lamp and Chelsea filter.

Microscopic Features

As mentioned above, most of these emeralds are characterized by haziness, caused by minute inclusions, which could not be resolved under standard gemmological microscope, however, appeared to be some colourless mineral. In addition, the most common inclusions were black grains of spinel (chromite, magnetite or picotite), which were present scattered throughout the stone, as well as in zones and planes. Further, few specimens also contained numerous colourless to white rounded crystals of phenakite, elongated blades of actinolite, mica plates and most strikingly rounded colourless grains of zircon with stress cracks (zircon halos). We have never seen a zircon halo inclusion in an emerald from any other source before not we could find a reference of a previous report. Interestingly, no fluid inclusions were present in any of the specimen used for this study.



Figure 3: Most of the Jharkhand emerald appeared hazy due to presence of minute mineral inclusions. Magnified 32x

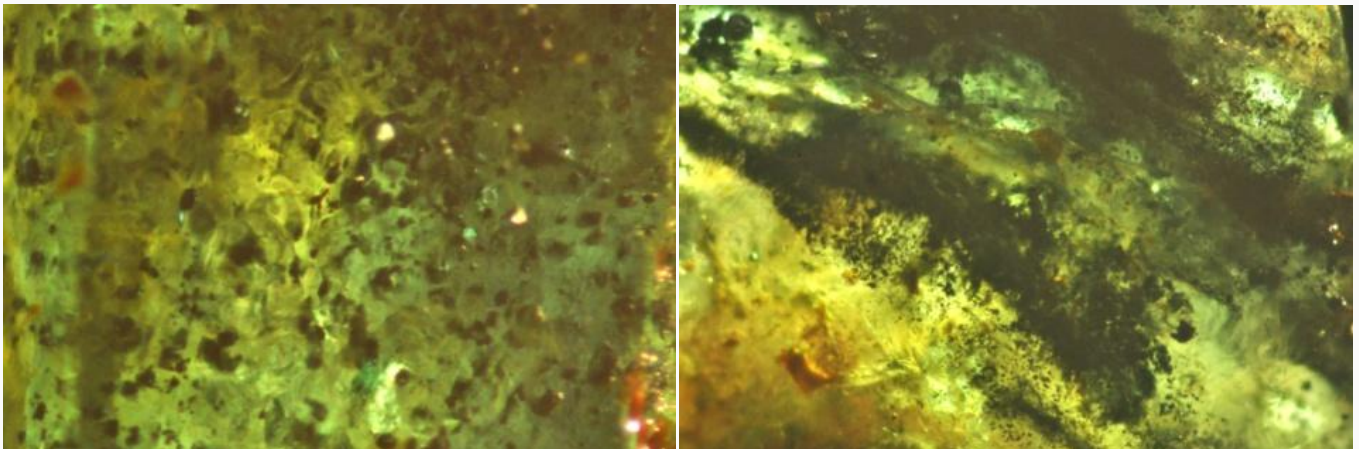


Figure 4: Majority of Jharkhand emeralds contained black grains (spinel group), which were present scattered throughout the stone or in planes or zones. Magnified 48x (left), 32x (right)

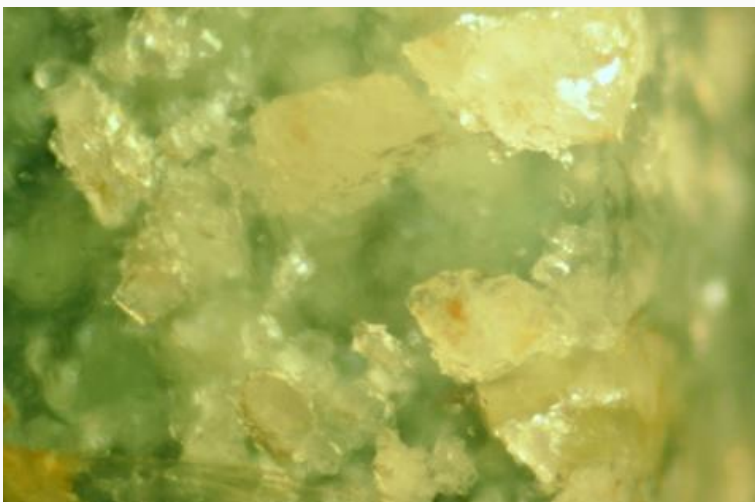


Figure 5: These whitish to colourless crystals in Jharkhand emerald have been identified as phenakite. Magnified 80x

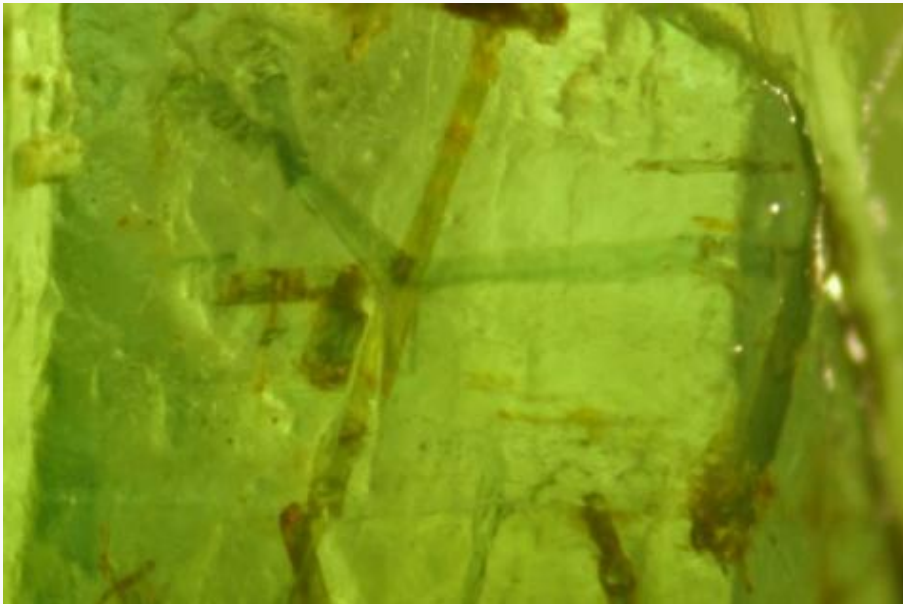


Figure 6: Actinolite blades were also seen in few specimens, which have been encountered in emeralds from other deposits too. Magnified 64x



Figure 7: Zircon-Halo was the most striking inclusion seen in these emeralds, which were never seen before in emeralds. Magnified 80x

Conclusion

This relatively new find of emeralds from the East Singhbhum district of the state of Jharkhand has produced a lot of interest in the local market and at very good prices. However, currently the deposits are being excavated through illegal mining, but the state government has already sent the proposal to acquire mining rights and clearances, which will help to regulate the supply of these emeralds. As per preliminary observations, these emeralds appear to be of decent colour and transparency, although in relatively smaller sizes, less than 5ct. Right now, it is too early to say, whether this deposit will contribute significantly to the emerald trade or is just another instance of 'sporadic encounter'.

References

- Anonymous (2012) Patrol plea for emerald hills. *The Telegraph* , Friday, December 21
- Anonymous (2012) Man arrested with emeralds. *The Telegraph*, Friday, November 9
- Anonymous (2013) Jharkhand emeralds cry for attention. *Journal of Gem & Jewellery Industry*, Vol. 51, No. 5, pp 10-14
- Jenamani K. (2012) Emerald hills eye state geology seal. *The Telegraph*, Friday , December 21

All photographs and photomicrographs by Gagan Choudhary

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