OPAL - QUARTZ ROCK WITH POLYMER SKIN

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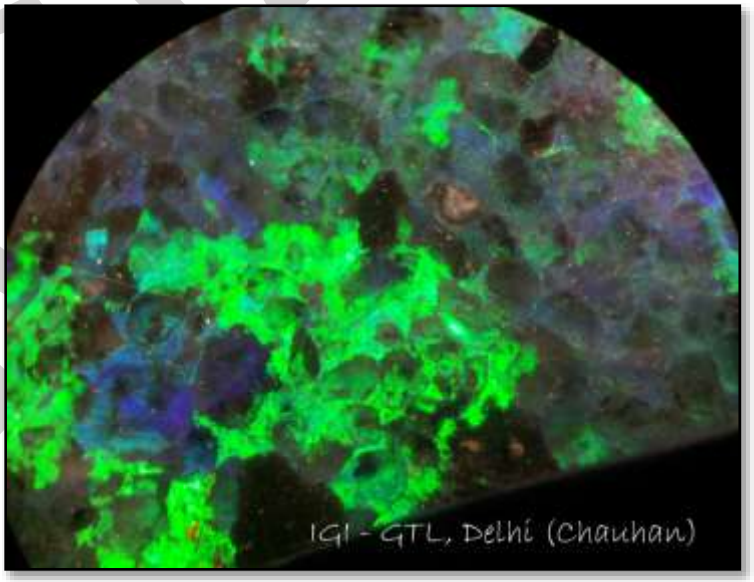
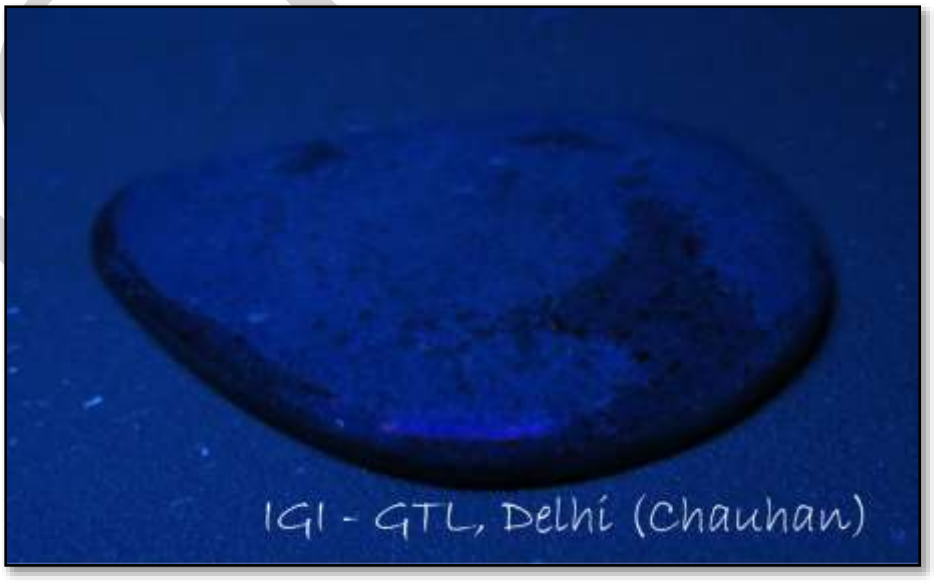
Indian Gemological Institute – Gem Testing Laboratory, Delhi received a 41.50 Ct semi-translucent brown stone measuring approximately 44.00 x 35.00 x 4.00 mm. Stone was exhibiting strong play of colour phenomenon with the flashes of blue and green colour.



Notice Play of colour is not visible on the surface of rounded crystals, rather is visible behind the crystal.

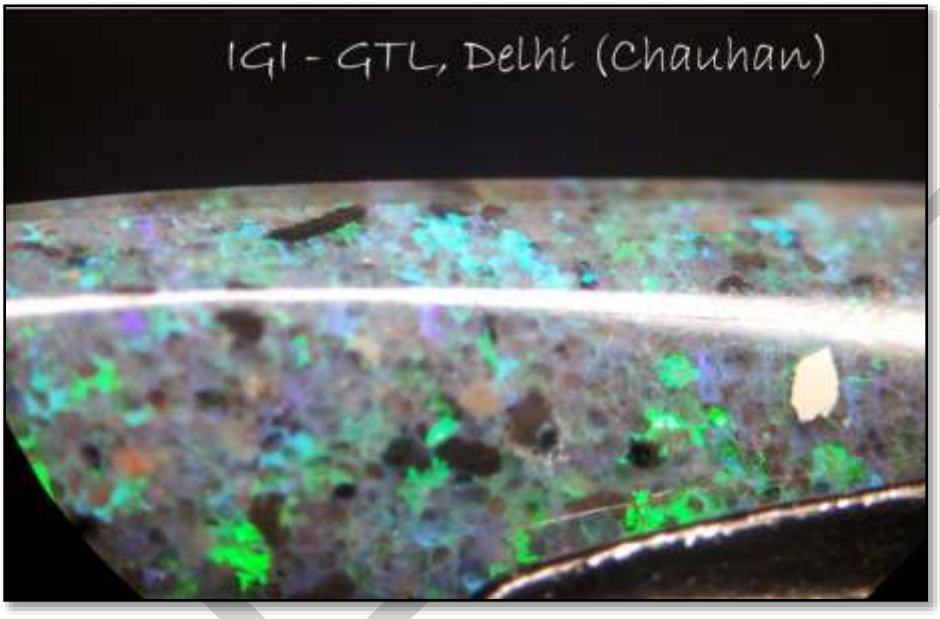
Prima facie, stone was appearing like Opal, but initial gemological testing results (R.I. 1.580 / S.G 2.34) were not identical to Opal. Stone was showing Chalky Greenish yellowish fluorescence in long wave UV and Chalky Bluish greenish fluorescence in short wave UV. Fluorescence was not uniform over the whole stone, rather was having strong and lighter fluorescence zones.

Stone under Long Wave UV. Uneven Fluorescence was due to the polymer coating over the stone. As polymer's layer thickness was not uniform over the whole stone.

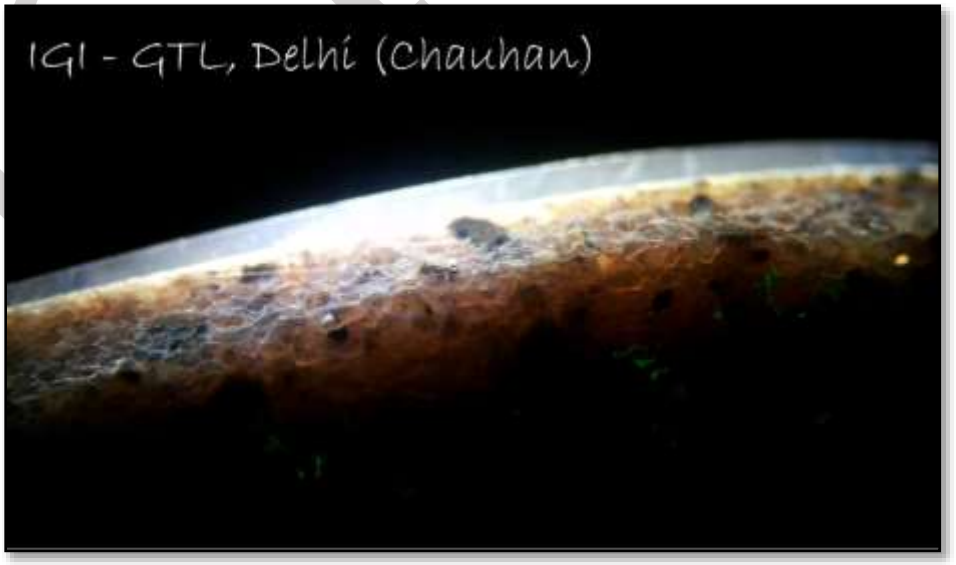


Stone under Short Wave UV. Uneven Fluorescence was due to the polymer coating over the stone. As polymer's layer thickness was not uniform over the whole stone.

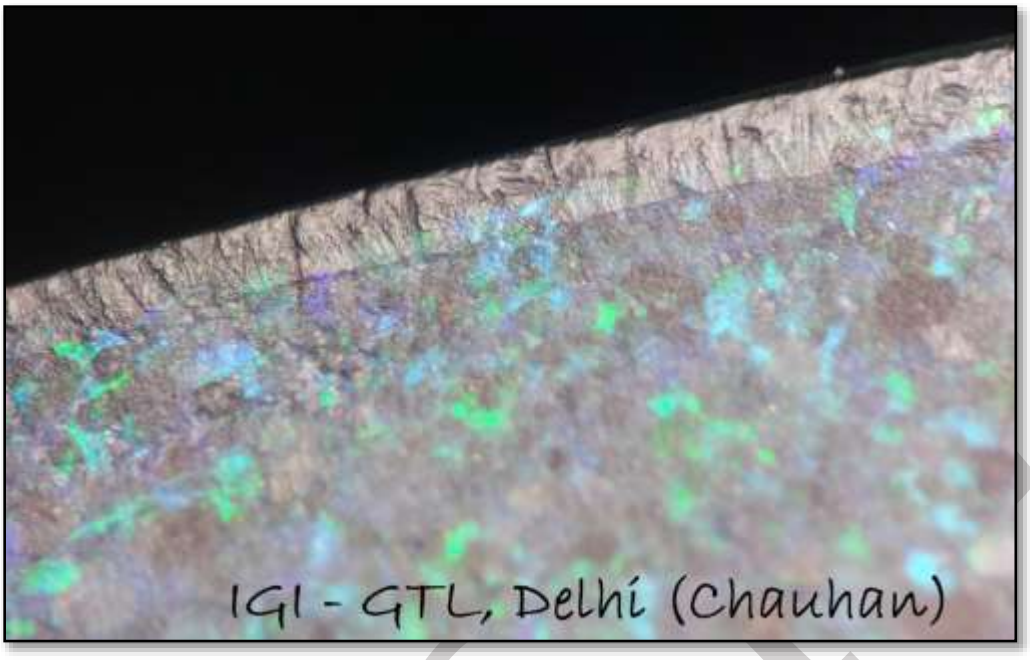
Under the magnification whole stone was observed to have transparent thick coating of polymer, except some portion on base. Most probably, while polishing some area on the base lost its polymer coating. On the edge of the stone polymer coating's presence was confirmed, as the thick layer of coating was appearing transparent with the thickness of approx. 0.5 mm.



Coat of polymer of approx. thickness 0.5 mm is visible on edge. Under overhead white light.



Coat of polymer of approx. thickness 0.5 mm is visible on edge. Under white LED light.

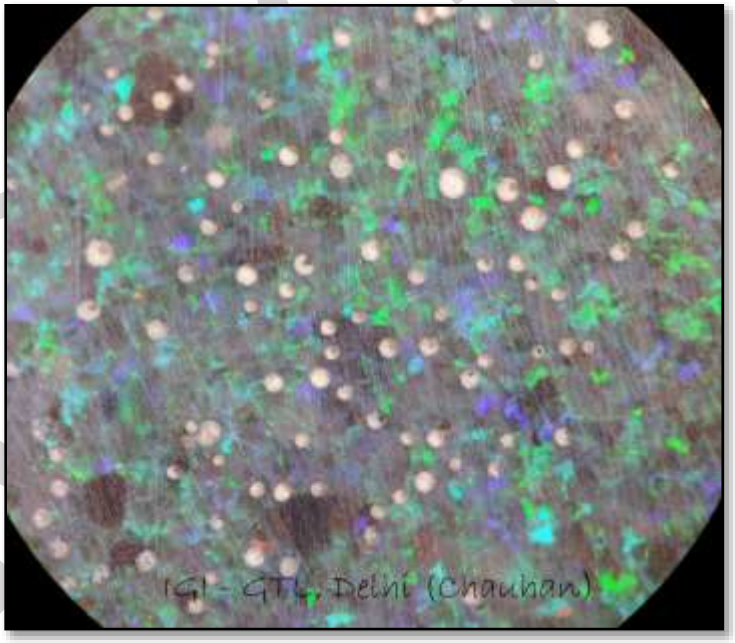


Difference in the surface texture was observed on the base. Polymer was appearing shiny and rock was appearing frosty with less shiny texture. Under overhead white light.

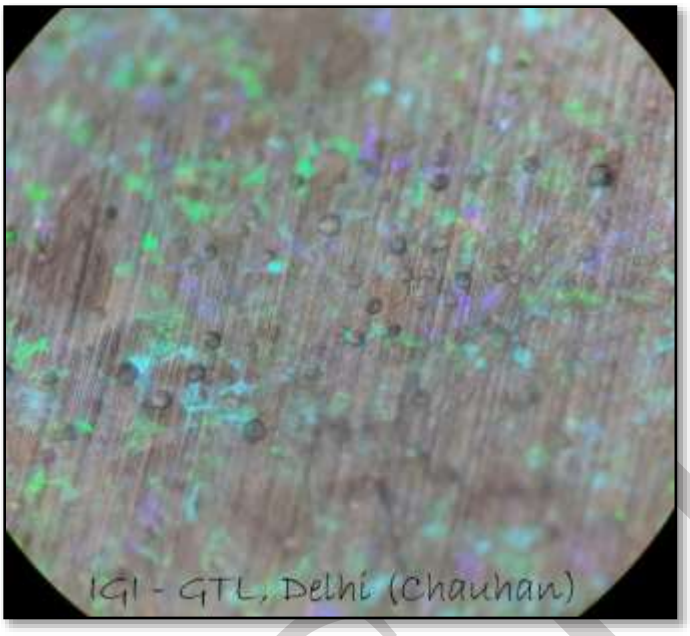
Stone was appearing as if small pieces have aggregated together. Stone was giving coarse appearance from the girdle by transmitting strong fiber optic light. Some black mineral as included crystals were also observed in between transparent crystals. Those transparent crystals were not showing play of color, rather material between those crystals was showing flashes of blue and green colour which was later identified as opal.

On the back side of the stone burst gas bubbles were present, confined to the area where polymer layer was present, confirming that stone is coated with polymer. In reflected light difference in surface texture of coated and uncoated area of stone was clearly evident.

Some area on base of the stone has lost its polymer coat while polishing. The shiny part is the polymer coated area, and area with coarse texture is Opal - Quartz rock.



Burst gas bubbles on the polymer coated surface of stone.



Burst gas bubbles on the polymer coated surface of stone. Note the polishing marks too.

In diamond view, small accumulated transparent crystals were almost inert and mineral between those crystals was showing blue fluorescence. Uniform blue fluorescence was observed on the whole stone, was due to coated polymer.

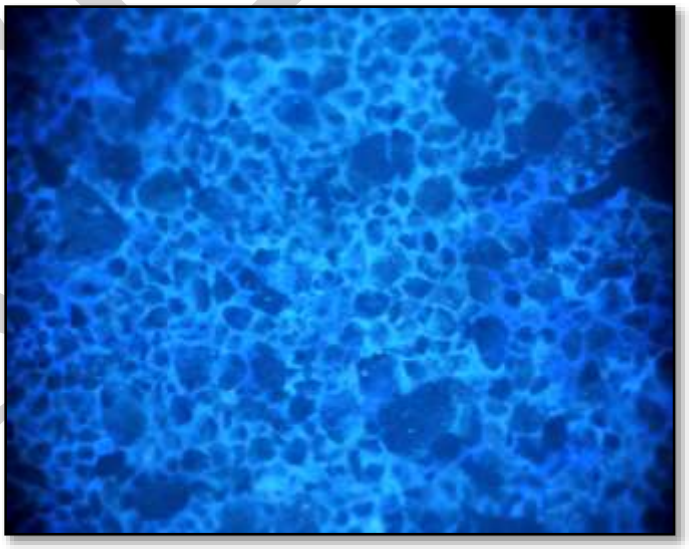


Image of the stone in Diamond View, with UV on. Quartz crystals are appearing inert (Appearing Dark blue) and whole stone was giving light bluish fluorescence, due to polymer coating.

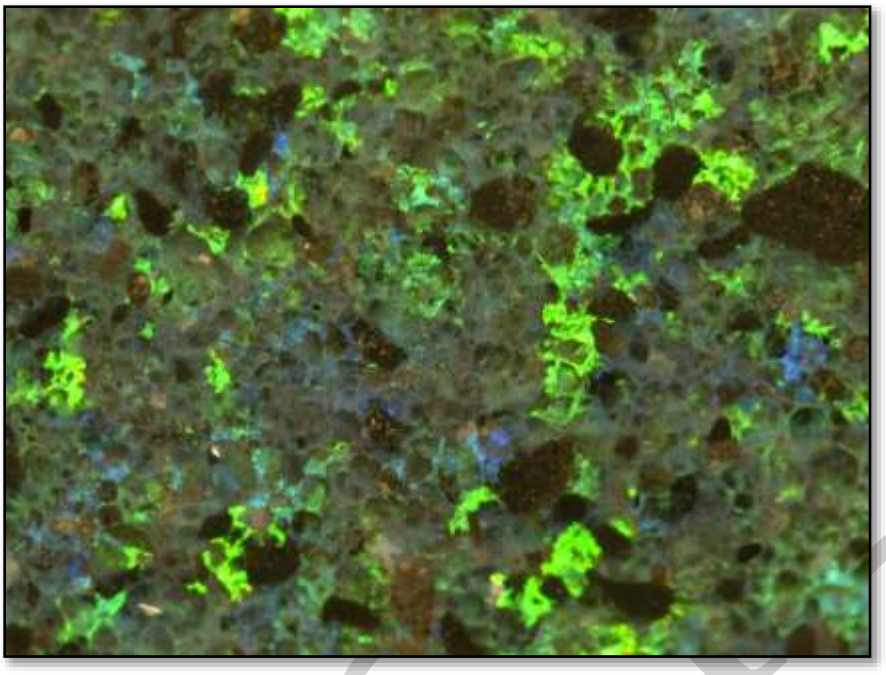


Image of the stone in Diamond View, with UV off.

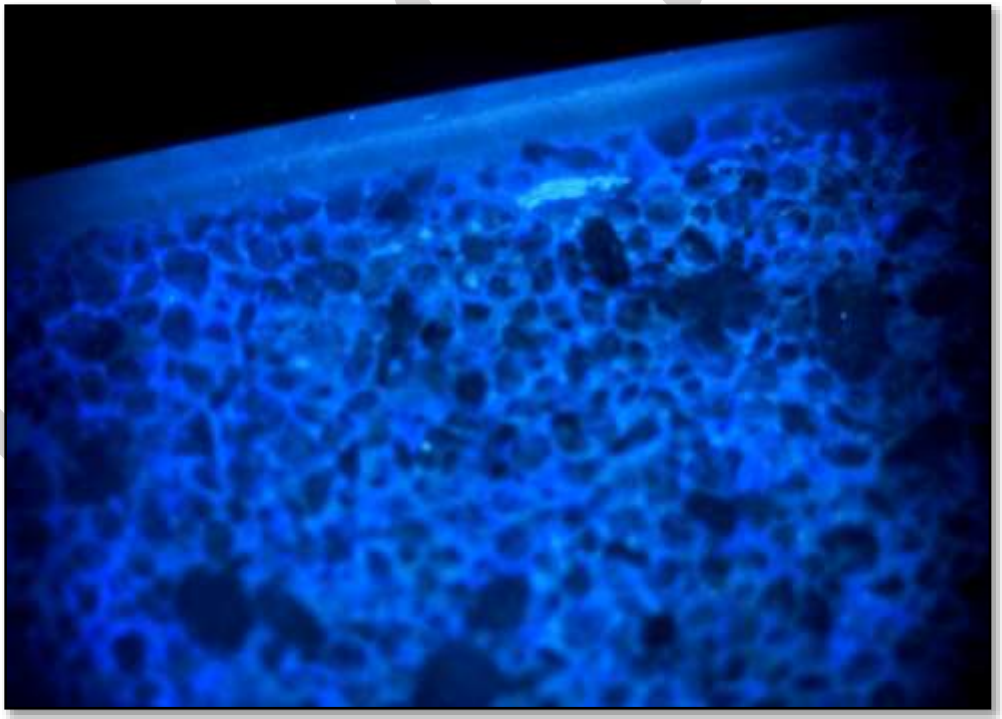


Image of the stone in Diamond View, with UV on. Quartz crystals are appearing inert (Appearing Dark blue) and whole stone was giving light bluish fluorescence, due to polymer coating. Note polymer coat on the edge of stone.

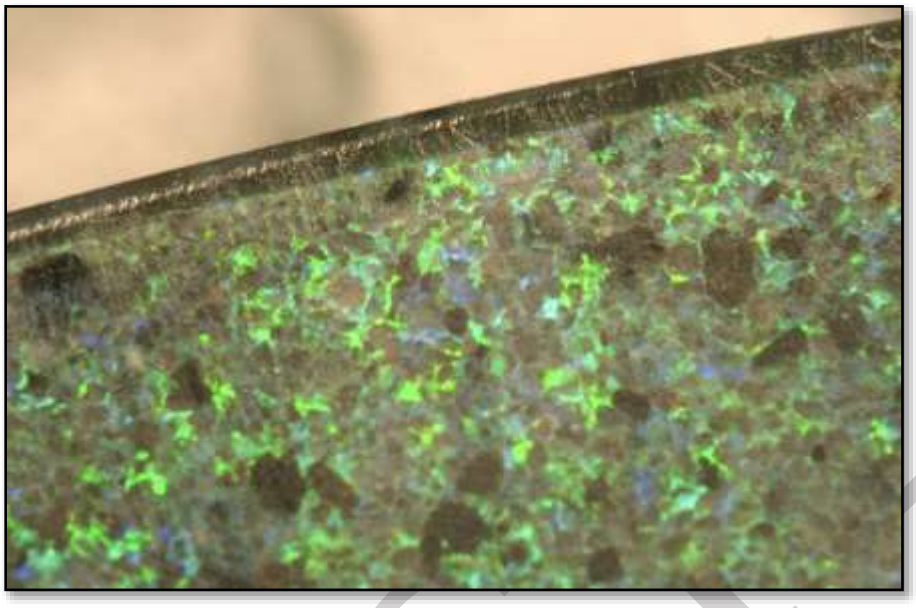
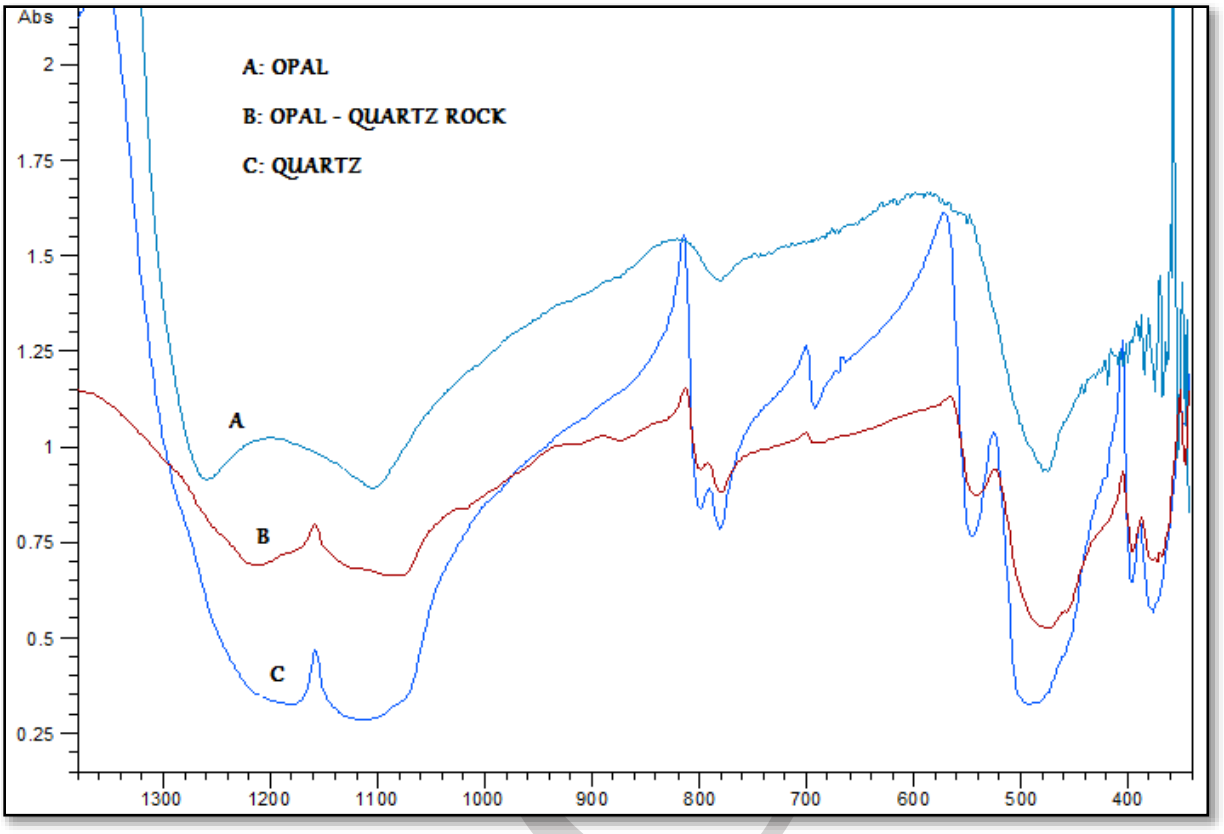


Image of the stone in Diamond View with UV off.

As the stone was almost opaque, fingerprint region of IR spectrum was analyzed. Stone was placed in the way, so that IR beam gazes the stone's surface, instead of entering the stone. Fingerprint region of IR spectrum of the stone showed clear absorption and transmittance peaks and assisted in identifying the material.

IR spectrum was taken from the back side of the stone where polymer coating was not present. Fingerprint region of IR spectrum of this stone resembled to the fingerprint region of Quartz's IR spectrum. But Play of color was raising the suspicion. We could not conclude if the stone was having Opal or not, as Fingerprint region of IR spectrum of Opal resembles to that of Quartz, absorptions seems to similar but the peaks in quartz are quite sharp in comparison to opal.



Fingerprint region of IR spectra of Opal (A), Opal - Quartz Rock (B) and Quartz (C)

So, conclusive identification could not be made, as even basic gemological properties were not clear. Customer was asked to get the stone to council's Jaipur lab, GTL for further detailed analysis. As discussed with Mr. Gagan Chaudhary, Deputy Director, GTL Jaipur, stone was analyzed on LRS and the stone was identified to be rock consisting of Quartz and Opal both.

Small Crystals of quartz were having opal in the space between them, which was showing play of colour.

It appears that the whole slab was coated with the polymer, most probably to give that strength and thickness. Such challenging stones are not possible to identify completely, concluding it's all components, in the absence of advance instruments.