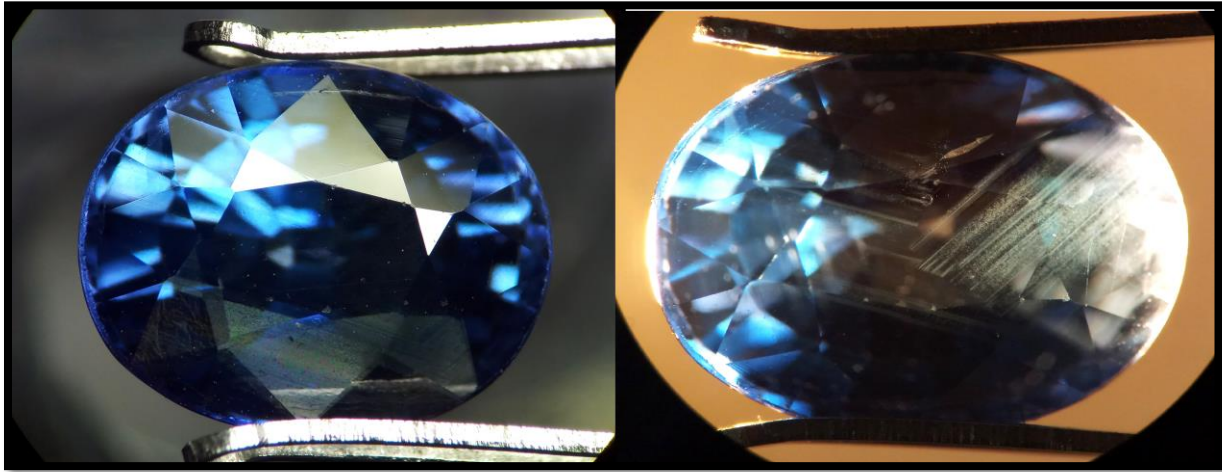


SAPPHIRE DOUBLET

Meenakshi Chauhan

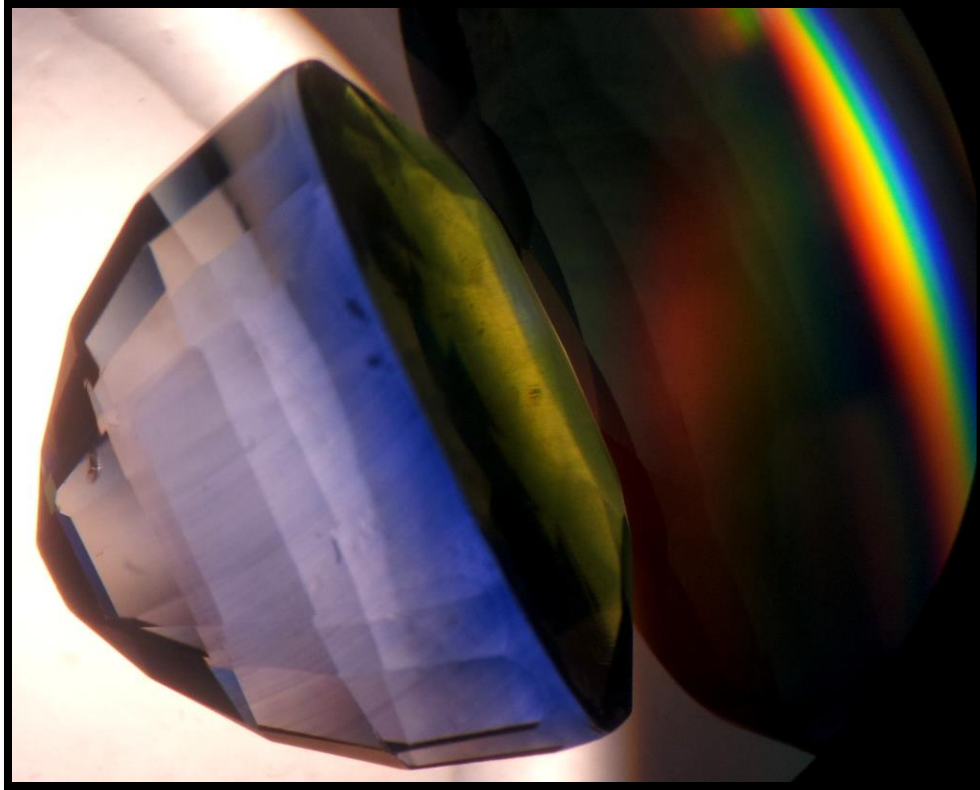


Sapphire Doublets (Crown: Natural Heated Yellow Sapphire; Pavilion: Synthetic Blue Sapphire) appearing Blue. Note, right image showing angular zoning.

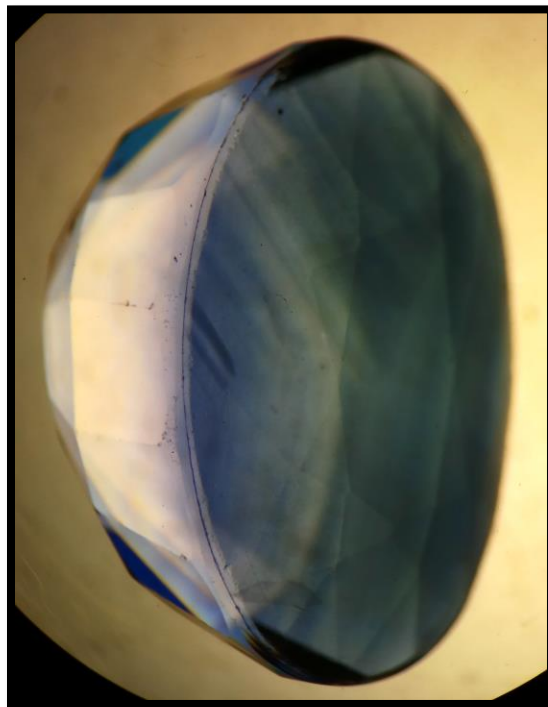
Assembled stones are not something new to the gemmology world. Several types of assembled stones are formed with motive to create a bigger stone, by combining smaller stones together, in less of price to fetch more of money. Assembled stone is formed by pasting natural and synthetic stones together, in the combination of natural with natural, synthetic with synthetic or synthetic with natural, depending upon the kind of assembled stone desired.

Both the crown and pavilion parts of assembled stone can be identified by R.I measurement. Specific gravity calculation are not conclusive for doublet identification, as both the stones are pasted together and so separate SG cannot be determined. IR Spectrum in fingerprint region of crown and pavilion portion also confirms the identity of both parts.

Sapphire is one of the most demanded gemstone, and a good quality carries high price. On the other hand, its synthetic counterpart is easily available in far less of price. Synthetic Sapphire bears same physical and optical properties (i.e. Refractive Index, Specific Gravity, Optic Character etc) as of its natural counterpart, and so their origin determination significantly depends on the analysis of inclusions under higher magnification.



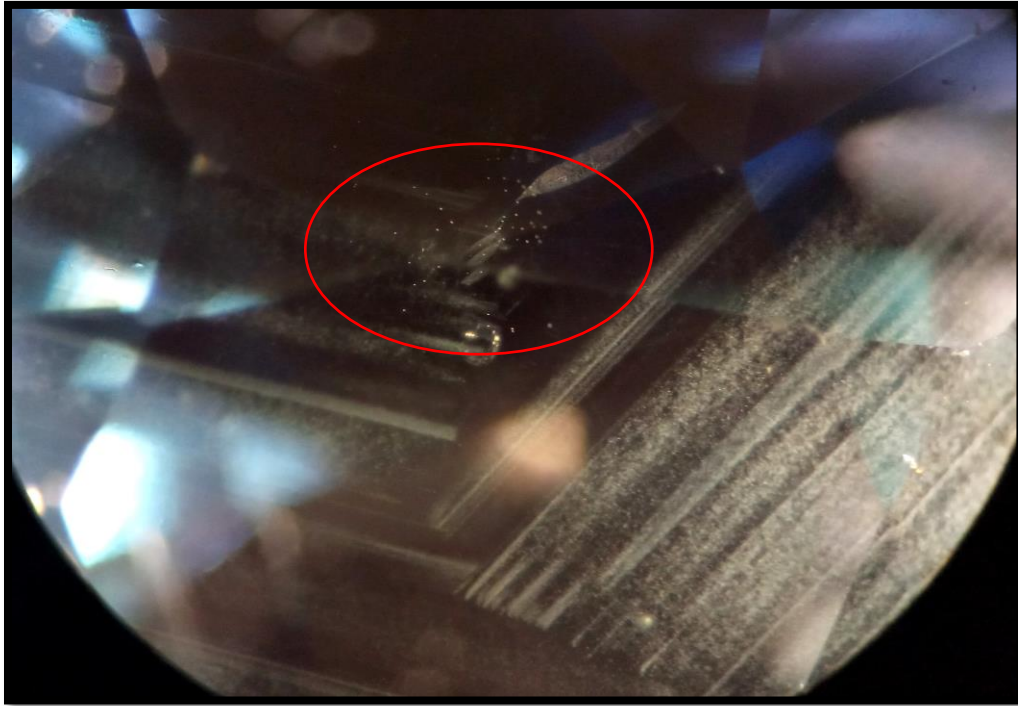
Sapphire Doublet immersed in Methylene Iodide, Crown and pavilion showing different colours. Note, curved color bands in pavilion. Light reflecting from the stone showing spectral colours on the beaker wall.



Sapphire Doublet immersed in Methylene Iodide, note sharp junction plane edge on the girdle. Crown showing angular colour zoning. Combination of Blue and yellow colour giving green appearance.

Several workings are encountered by which synthetic sapphires are doctored to appear like a natural sapphire. One of such act is forming a Sapphire doublet, made by combining Synthetic Sapphire with a Natural Sapphire, in a way that prima facie look is perfect enough to convince that stone is wholly natural.

Usually, sapphire doublets are fashioned in such a way, that characteristic inclusions, like angular zoning or color bands, which may conclude the stone to be of natural origin, are prominently visible from crown.

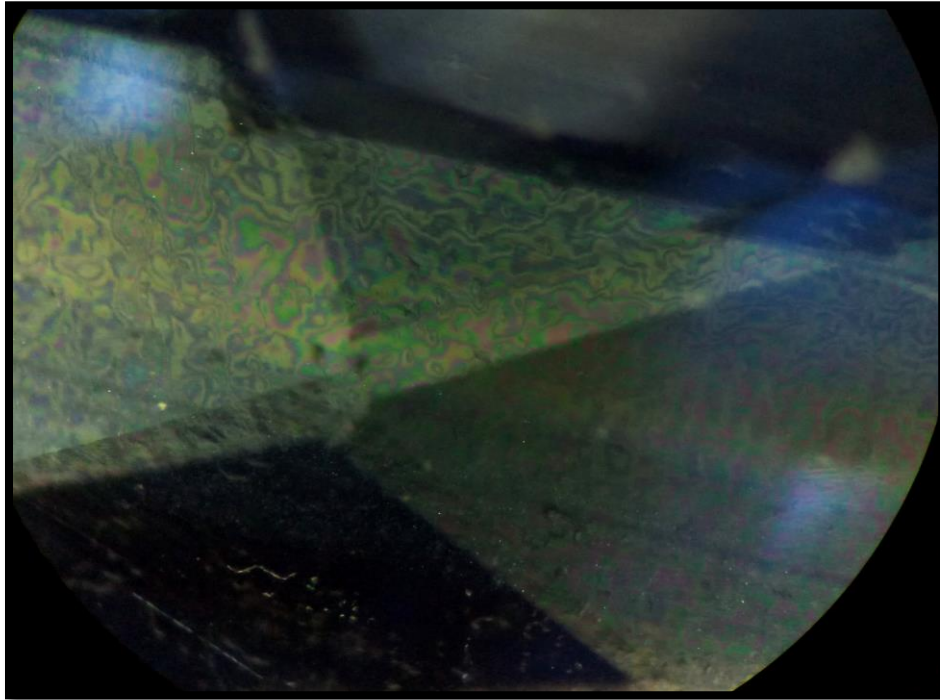


Angular zoning visible from crown view; note: Gas bubbles visible in the center of image marked red.
GB's are inclusion of pavilion part, Synthetic Blue Sapphire.

One of such type of Sapphire Doublets, which have been received in IGI-GTL, are formed by pasting Heated Natural Yellow Sapphire as crown and Synthetic Blue Sapphire as pavilion together. Colour of crown is prominently yellow but yellow colour gets suppressed by the blue colour of pavilion and whole stone appears blue from crown view with bare eyes. Even from the side, colour difference of crown and pavilion is hard to detect. Under magnification, crown showed inclusions angular growth zoning, angular colour zoning, burned fingerprints, identical to Natural Sapphire. Pavilion showed inclusions gas bubbles and curved colour bands, identical to synthetic sapphire.

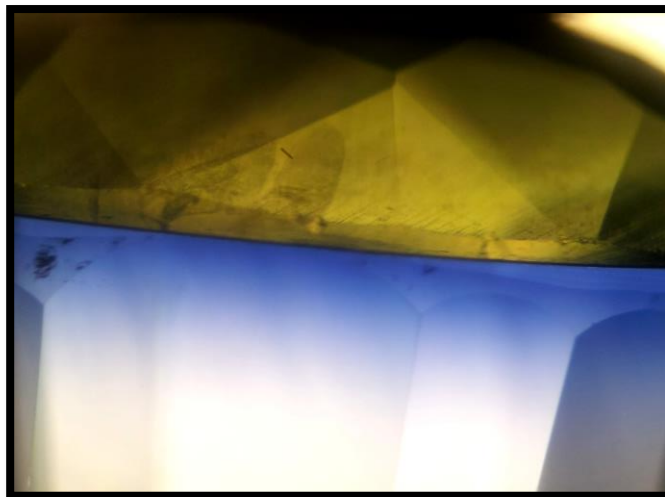
Junction plane is vital optical feature to identify a doublet. Junction plane shows trapped gas bubbles and many times dirt particles trapped in between. Sometime depending

upon the glue used, reflecting spectral colours can also be seen on junction plane, appearing somewhat like oil on water effect.



Water on oil effect on junction plane, visible from crown view under white reflecting light.

Usually these features concluding the doublet can be seen under microscope but it's recommended to analyze the doublet in immersion. Under immersion, colour difference of crown and pavilion and junction plane can easily be identified.



Sapphire Doublet immersed in Methylene Iodide, colour difference of crown and pavilion is identifiable with junction plane in between.