NEW BLUE DIFFUSED SYNTHETIC SAPPHIRES IN THE MARKET

Figure 1. These examples of diffused synthetic sapphires range in size from 7.01 to 10.46 ct, showing strong blue colors. Photo by P. Ounorn

Since 2015, the huge quantity of blue diffused synthetic sapphires appeared in the Chanthaburi market but many of them have been trading as blue diffused natural sapphire result to the confusion in the market, Therefore, this new material showing some unusual characteristics that can mislead gemologist and gem dealer to fault identify those stone. Some of the stones (Figure 1) were extensively studied by GIT-GTL, and their gemological properties have been documented by using both basic and advanced gem instruments. The analytical results reveal that they originally were colorless synthetic sapphires that had been undergone diffusion treatment. Even though, blue diffused synthetic sapphire has been produced for decades but the features in these new diffusion-treated synthetic sapphires appeared to be somewhat different from what was reported previously in the literature (e.g., Kammerling et al., 1992) such as lack of plato twin under immersion scope and the presence of numerous minute inclusions that may resemble the cloud appearance found in natural sapphire. In contrast, there are several important characteristics that suggest to the synthetic origin of the starting materials such as relatively strong chalky blue fluorescence to SWUV radiation (Figure 2 left), curved bands of minute particles (Figure 2 center) and very low contents of trace elements especially gallium (Ga) and iron (Fe). The diagnostic evidence that indicates the stones were subjected to a blue-diffusion treatment are the existences of 'spider-web effect' (Figure 2 right) and very high titanium (Ti) contents on the surfaces. Additional testing with LIBS showed a trace of beryllium (Be), which could indicate beryllium involve during the treatment. The further research of these material has been prepared and the result will be published in the international journal.

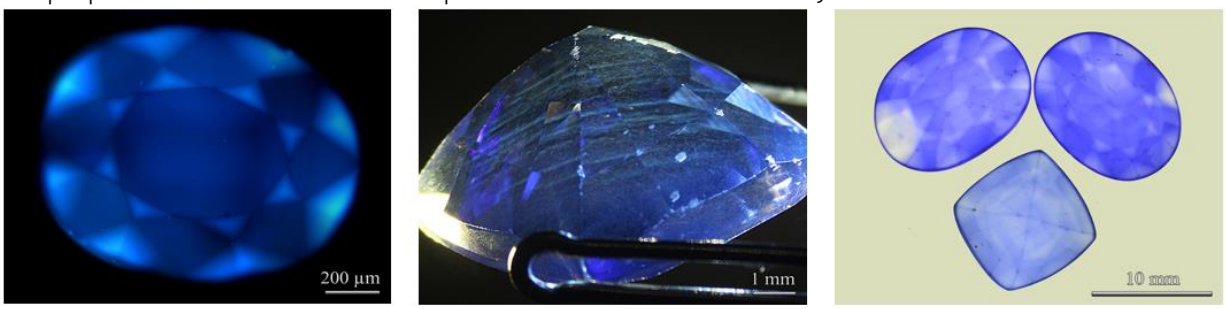

Figure 2. Left: Fluorescence images of sample showed different chalky bluish intensities under deep-ultraviolet luminescence imaging system of DiamondView™ instrument. Center: Curved bands of unusual clouds of minute particles were also observed. Right: All samples reveal varying blue color concentrations on different facets. Photos by P. Ounorn

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References

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