CHAPTER 8

CONCLUSION

There are various surface observation which are important for Treated Gemstone Identification. Gemstone stone is examined in reflected light, minute hairline fissures can be observed breaking the surface of the stone. It is through these fissures that glass fillings are introduced. Glass-filled pits may also be observed in reflected light; these areas have a different quality of polish than the surrounding gem and following the path of the fissure and looking into the depths of the gem, glass fillings may be observed. These generally contain rounded gas bubble inclusions. If they are constricted to a smaller fissure, these gas bubbles can become elongated and "squashed" in appearance. As rubies do not have this kind of inclusion in nature, glass filling should be strongly suspected. Then Flash effect is due to the refractive index of the glass and the host ruby may be similar, their dispersion is different. Under magnification, the point of contact of these two substances (glass and ruby) within a fissure often leads to a "flash effect," an optical phenomenon that is manifested in a variety of different colors including violet, purple, blue and green. It can be observed flashing on and off when the gem is rocked and turned under magnification

Detailed observation of internal features is very important to identify treated and untreated Gemstone. As many crystal inclusions have lower melting point than corundum, they may be fused or discoloured by heating. Spectral analyses in UV-visible and infrared regions also give us important information on detection of treated/ untreated status in gemstone. Especially in infrared spectral analysis, different features are observed in Gemstone of different origin, so that knowledge of geographic origins and analytical ability of an operator are essential. Raman spectroscopic analysis is useful to identify treated / untreated status both directly and indirectly.

The effect of irradiaton and heat on the colour of minerals well illustrates the danger of rash conclusions concerning the origins of these colours. Usually irradiation produces electron or hole colour centrers, while heating permits the trapped electrons and holes to recombine again. The process is reversible and heat-bleached amethyst can usually be recolored by irradiation. An apparently similar change, the converting of golden or green beryl to blue aquamarine on heating can also be reversed by

irradiation. Nevertheless, in this case a color center is not involved, but merely a valence change which eliminates a yellow-producing Fe3+ absorption at the violet end of the spectrum on heating; the resulting Fe2+ does not absorb in the visible and the original color can be restored by irradiation. In the case of pinktourmaline both an electron color center as well as a hole color center have been proposed, but an examination of a large number of specimens by irradiation and heating indicated the occurrence of at least seven differently-behaving pinks. Clearly, much caution must be used in explaining specific colors.

Inclusions are another result of heat treatment. An exploded inclusion is caused when crystals or liquid within the stone expand and contract at different rates than the surrounding material, causing a fracture. Keep in mind that not every inclusion explodes during heat treatment: the likelihood varies depending on the temperature of treatment and the particular identity of an inclusion. As a result, certain types of intact inclusions indicate lack of treatment, while others may not.

In general, inclusions surrounded by fractures are strong evidence of heat treatment. Caution is needed in making this identification, though, since naturally occurring fractures can be mistaken for stress fractures caused by treatment. The best way to practice identification is to observe as many heat-treated stones as possible. Inclusions, these tiny bits of entrapped foreign debris or structural irregularities, reveal much about the gems in which they lie entombed. Often regarded as flaws, which detract from a stone's value, they are actually valuable clues that help unravel the secrets of a gem's past and latest treatment . Not only do inclusions speak to us of the place of formation, but they also serve as hallmarks of the processes which gave rise to precious stones.

To identify heated corundum, detailed observation of internal features is very important. As many crystal inclusions have lower melting point than corundum, they may be fused or discolored by heating. Spectral analyses in UV-visible and infrared regions also give us important information on detection of heating / non-heating status. In infrared spectral analysis, different features are observed in corundum of different localities, so the information on localities and anlytical ability of an operator are essential.