

BLUE COLOURATION OF COLOURLES SRI LANKAN TOPAZ

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Topaz [Al₂SiO₄(F, OH)₂] occurs as an accessory mineral in aluminous rocks. Most of the natural topaz is found as colourless, and therefore often colour enhancement methods are used for colouring of these material and use as beautiful gemstone. Existing methods have some limitations. In Sri Lanka the second most frequently found low quality gem mineral in the Ratnapura gem market is topaz. Normal practice of gem traders in Sri Lanka, is to export these colourless topazes without any colour enhancement. Therefore, to get optimum benefits from gem resource in Sri Lanka, value addition to colourless topaz through colouring process is of highest important. Thus, the main objective of this research work was to find out easy, low cost and non-harmful colour enhancement method for colourless topaz. To perform this study rough colourless topaz samples were collected from the Ratnapura Gem Market. Each sample were cut in to five (5) slices and both sides were polished. A slurry made of carbon powder, CoCO₃ and depoxy was prepared. Slices of the selected colourless topaz were coated by the slurry and heat treatment was performed at 900 °C in a Muffle Furnace for 25 hrs. The resulted colour was observed. Then, the second batch of colourless topaz was coated by the same slurry and heated at 950 °C for 11 hrs. In addition to that, the same procedure was repeated thrice, and colour of the samples was observed. Furthermore, another colourless topaz slice was dipped in a dry mixture consists of carbon powder and CoCO₃. Then, heat treatment was performed at 950 °C for 11 hrs and colour of the sample was observed. The results clearly showed that, Co diffusion at 900 °C for 25 hrs resulted in bluish green colour. The resulted colour is comparatively not suitable for gem quality. However, light blue colour could be obtained by the sample reheating with Co. Furthermore, blue colour topaz was obtained by Co diffusion in 950 °C for 11 hrs. Therefore, the results clearly revealed that, optimum condition for Co diffusion to the topaz is 950 °C for 11 hrs. In order to increase blue colour of the topaz multi-step diffusion is suitable. The results clearly showed that, there is great potential to obtain blue color topaz by Co diffusion from either slurry method or dry powder method. A detailed chemical investigation is needed to interpret the colour formation

mechanisms. Therefore, detailed investigations are continuing. The results clearly reveal that, there exists a great potential to convert colourless topaz to coloured topaz with blue green and greenish blue colours by Co-diffusion. Hence, the results of this study will be useful to harvesting of gem resource at optimum level through colouring of colourless topaz.

Keywords: *colourless topaz, colouration, heat treatment, Co-diffusion*