MICRO-RAMAN STUDY OF HYDROXYLS IN BRAZILIAN TOPAZES

1,2PINHEIRO,M. V. B., 1LEITE, C. F., 1DANTAS, M. S. S., 1PIMENTA, M. A., 1KRAMBROCK, K., 2LAMEIRAS, F. S. and 1KARFUNKEL, J. 1UFMG, Belo Horizonte, Brasil; 2CDTN, Belo Horizonte, Brasil.

We present results of a systematic Micro-Raman characterisation of hydro- xyls in blue and colourless topazes from several regions in Brazil (Rondônia, Mi- nas Gerais), as well as in the highly valued 'Imperial' topaz from Ouro Preto (Minas Gerais). Using as excitation the green line of an Ar-ion LASER (514.5nm) it was possible to observe a strong asymmetry of the line at about 3650 cm-1 related to the OH- stretching mode. This asymmetric line was highly sensitive to the OH- level, which was indirectly de- termined from the refraction index mea- sured with precision by using the co-focal properties of the Micro-Raman spectrometer. After calibrating its intensity with the SiO4 Raman lines, the asymmetric OH-related line could be fitted to two Gaussians (OHA at 3637cm-1 and OHB at 3647cm-1). Assuming that this splitting resulted from the substitution of OH- for F- in two distinct sites nearby an Al3+, the asymmetry could be explained as an increase of the occupation ratio of the two sites, [OHA]/[OHB], with the increase of total OH- concentration. The widths of the two OH- lines were also determined as approximately 40% larger for the Imperial topazes than for the blue and colourless, indicating that for higher OH-concentrations the local disorder in the structure is enhanced.