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ABSTRACT BOOK

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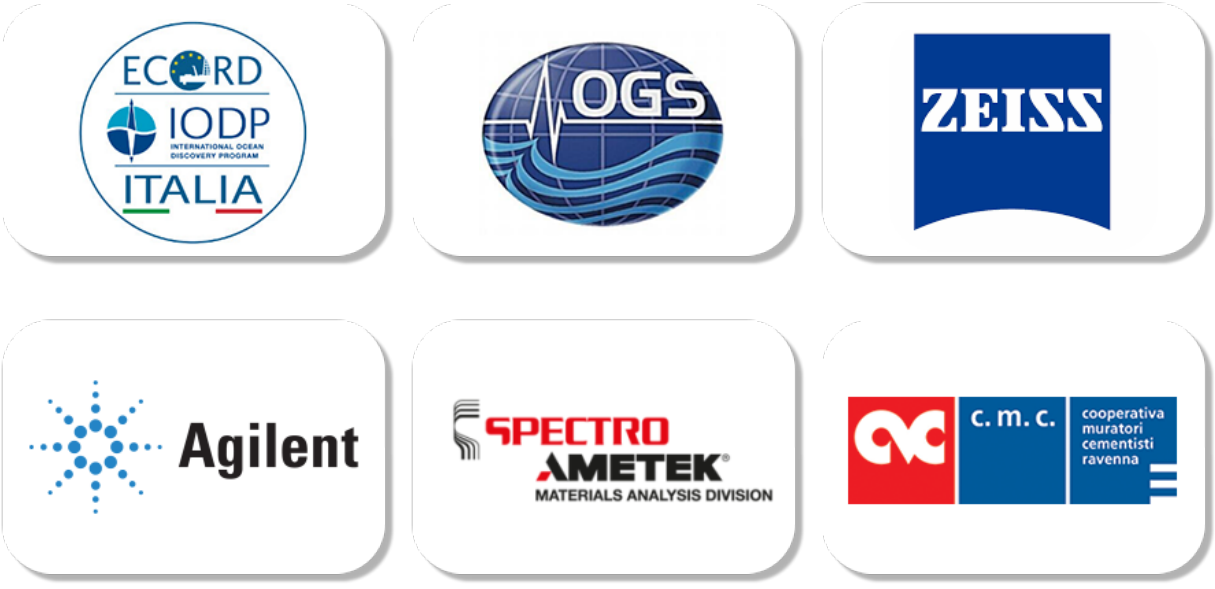

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ABSTRACT INDEX

Characterization of colorless topaz samples from Minas Gerais (Brazil) and Gilgit- Baltistan (Pakistan): a multi technical approach to highlight the different chemical and structural features

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In this work, a multi technical approach has been used to characterized Brazilian and Pakistan topaz samples through the use of spectroscopic and diffracttometric techniques in order to determine the possible evidence of different features between the two deposits. These clues could be useful to identify stones of unknown provenances. Gem-quality topaz, $Al_2SiO_4(F,OH)_2$, is one of the most important F/OH-bearing silicates (Gatta et al., 2006), and crystallise in a granitic pegmatoid matrix or most in general it is associated to pneumatolithic/ hydrothermal events occurring in silicic igneous rocks (i.e., mostly granites and rhyolites). In particular, the most precious topaz gems come from Brazil, Russia, Japan and Pakistan and they are commercially known as top quality gems. Commonly, variously coloured topaz gems are widely used in jewellery, while colorless or light-blue stones have not relevant commercial value. The chemical characterization was carried out combining X-Ray Fluorescence (XRF), Scanning Electronic Microscopy (SEM-EDS) and Laser Ablation Inductively Coupled Plasma Mass (LA-ICP-MS) The obtained results highlight the main geochemical characteristics of analysed samples, in particular the high presence of metalloids (*i.e.*, Se, Ge, Ga) and Rear Earth Elements (REE) (*i.e.,* Y). Raman spectroscopy, and. Afterwards, the samples have been characterized by X-ray powder diffraction. Specifically, the data were collected at the high resolution beamline ID22 at the European Synchrotron Radiation Facility (ESRF, Grenoble, France). Cell parameters were calculated from X-ray diffraction data by means of the Rietveld method and fluorine content (w_F) was estimated by a and b unit-cell dimension. A critical correlation of the w_F *versus* the refined lattice parameters and the known data allowed us to improve the regression lines for w_F *versus a* and *b* cell edges (Alberico et al., 2003). Finally, Raman spectroscopy allowed us to recognized the characteristic bands of the SiO_4 tetrahedra and Al-F stretching, the bending of SiO_4 tetrahedra and of Al_2O_3 octahedra and also the OH^- characteristic bands. Moreover, this technique enabled us to determine the nature of the solid inclusions present only in the Pakistan samples. To conclude, the chemical and structural data obtained by XRF, SEM-EDS, LA-ICP-MS, XRD and Raman techniques, document the occurrence of typical topaz patterns in spite of the different origin and composition of the host rock.

Alberico, A., Ferrando, S., Ivaldi, G., & Ferraris, G. (2003): X-ray single-crystal structure refinement of an OH-rich topaz from Sulu UHP terrane (Eastern China)-Structural foundation of the correlation between cell parameters and fluorine content. European Journal of Mineralogy, 15(5), 875-881.

Gatta, G.D., Nestola, F., Bromiley, G.D. & Loose, A. (2006): New insight into crystal chemistry of topaz: A multi-methodological study. American Mineralogist, 91(11-12), 1839-1846.