COMPOSITIONAL AND STRUCTURAL CHARACTERIZATION OF QUARTZ FROM SOUTHERN REGION OF MINAS GERAIS

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Quartz (SiO_2) is one of the most abundant minerals in Earth's crust and the most important silica mineral. It is one of the most widely studied naturally occurring thermoluminescent (TL) minerals. TL appears in irradiated semiconductors and insulators upon heating, and suitable dosimeters are the ones whose TL intensity is proportional to the radiation dose absorbed. Natural dosimeters, as minerals, find application, e.g., in retrospective dosimetry, geological and archeological dating. In this work, the objective was to investigate the morphology, composition and structure of quartz that are going to be further investigated by thermoluminescence in the research group. The samples analyzed were the blue quartz, green quartz, rose quartz and milky quartz from Minas Gerais (Brazil). Scanning Electron Microscopy/Energy Dispersive Spectroscopy (SEM/EDS) technique was used to determine the morphological and compositional characterization of quartz using a Bruker S8 Tiger WD X-ray fluorescence spectrometer with *QuantExpress Full Analysis* mode. The X-ray Difraction (XRD) technique was used to determine the quartz crystalline phases using an EMPYREAN spectrometer equipped by a CuKα radiation source (1,541 Å), generating a current of 40mA and a potential of 45 kV. The SEM/EDS results showed the presence of impurities, as sodium, magnesium, potassium, iron, chrome, aluminium and titanium. In the XRD results, colored quartz samples showed characteristic XRD peaks about 26º referring to the family (101), so that all samples presented quartz phases. However, for green and blue quartz, other crystalline phases associated with muscovite minerals ($KAl_2(Si_3Al)O_{10}(OH)_2$) were found in both quartz, and orthoclase (KSi_3AlO_8) in blue quartz. It concludes that the samples had peaks of XRD quartz patterns, and the presence of other crystalline phases is due to the geological local formation.

Acknowledgements: R.T.E.K. Martins thanks to PIBIC (#2021/SPO.0103). I. A. Ferreira thanks to FAPESP (#2021/05042-0). E. M. Yoshimura is grateful to CNPq and FAPESP (#18/05982). N. M. Trindade is grateful to FAPESP (2019/05915-3) and IFSP/IFSULDEMINAS.