Thermoluminescence Of The Blue And White Chalcedony From Turkey. I.C.Keskin, M.I.Katı, M.Turemis, B.Tastekin, R.Kibar, A.Çetin and N.Can, Celal Bayar University, Faculty of Arts and Sciences, Physics Department, 45140 Manisa-Turkey, email; ilkercetinkeskin@hotmail.com

Chalcedony is a cryptocrystalline form of silica, composed of very fine intergrowths of the minerals quartz and moganite. These are both silica minerals, but they differ in that quartz has a trigonal crystal structure, whilst moganite is monoclinic. Chalcedony's standard chemical structure (based on the chemical structure of quartz) is SiO_2 (silicon dioxide). Chalcedony includes carnelian, sard, plasma, prase, bloodstone, onyx, sardonyx, chrysoprase, thundereggs, agate, flint, chert, jasper, petrified wood, and petrified dinosaur bone just to name a few of the better known varieties. The name is an old name, and almost all mineral reference guides and collectors distinguish chalcedony separately from quartz. Natural chalcedony crystals are found in nature with white, blue, red, green, yellow, orange, brown, pink, purple, gray, black, colorless, and multicolored. In the gem trade, the name chalcedony usually describes only white or blue chalcedony, to distinguish it from the multicolored banded variety agate and other unique varieties of this mineral. Impurities are frequently present in chalcedony. They may form a moss like growth in the mineral, forming what is known as moss agate. Another example is dendritic agate, a variety of Chalcedony containing manganese oxide impurities that form fabrications resembling trees.

In this study, we compared with blue and white chalcedony. For this purpose, thermoluminescence (TL) glow curves in the temperature range between 50-400 ^{o}C were recorded from these minerals after exposed to X-ray. As seen form figure 1, the glow curve pattern shows TL peaks at 110 ^{o}C, 150 ^{o}C, 310 ^{o}C, 355 ^{o}C for white chalcedony while one main peak is observed at 110 °C for blue chalcedony. Figure 2 shows the TL glow curves of white chalcedony after exposure to X-ray in the dose range from 300 to 900 Gy. As can be seen from the figure, up to the maxima dose investigated no saturation was observed in the behaviours of the TL curves but their intensities increased with larger doses. The samples was also studied by using optical absorption spectroscopy.

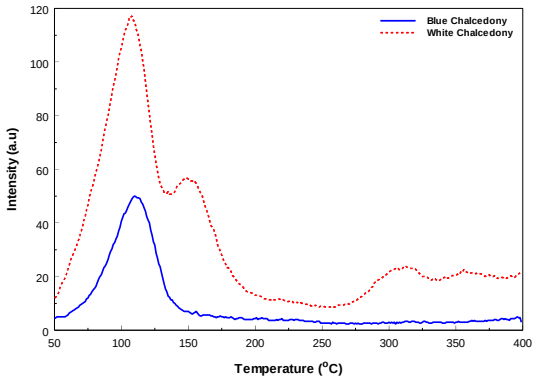

Fig.1 TL glow curves of blue and white chalcedony from Turkey after exposed to X-ray for 10 minutes.

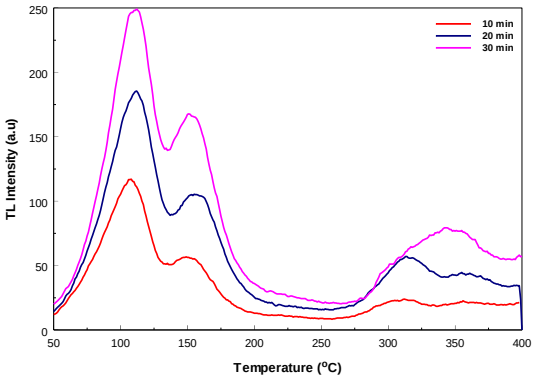

Fig.2 TL spectra of white chacedony after exposure to X ray in different doses.

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References: [1] M. Hatipoğlu et.al. Physica B 405 (2010) Issue 22, 4627–4633. [2] M. Hatipoğlu et.al. Physica B: Condensed Matter, 405 Issue 7, (2010), 1729-1736.