

## **Gamma and Neutron Detection of Un-doped and Doped (Eu, Dy, B) Calcium Silicate Polycrystal**

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The use of different types of radiation is being increasingly widespread in various human activities such as in several industrial and nuclear technologies, where high radiation doses are involved, while in medicine usually low doses are involved. The radiation, on the other hand can be harmful to human being so that gamma and neutron radiation dosimetry becomes very important. There exist different detectors systems in radiation dosimetry but that based on the thermoluminescent crystals being one of the most important. For example, LiF based LiF:Mg,Ti (MTS) and LiF:Mg,Cu,P (MCP) that proved to be good detectors for gamma-rays, neutrons and other radiation [1]. On the other hand, natural silicate minerals proved to be very sensitive TL materials. In our laboratory several natural silicate minerals have been investigated, among them, the green quartz was proved to be very sensitive dosimeters both for low (mGy) and for high and very high radiation doses (kGy-Mgy) [2]. In this work, we produced in the laboratory polycrystals of CdSiO<sub>3</sub> and CaSiO<sub>3</sub>. With respect to CaSiO<sub>3</sub> we produced polycrystals doped with Eu, Dy, Cd and B. CaSiO<sub>3</sub> doped or not has shown to be excellent detectors of gamma-rays as well as of neutrons produced in a research reactor (reactor IEA-R1 from Institute for Energy and Nuclear Research). CdSiO<sub>3</sub> presented a TL peak at low temperature, therefore is unstable, while all CaSiO<sub>3</sub> detectors have shown an excellent behavior.

[1] Obryk B., Khoury H. J., Barros V. S., Guzzo P. L., Bilski P. (2014). On LiF:Mg,Cu,P and LiF:Mg,Ti phosphors high & ultra-high dose features. Rad. Meas., v. 71, p. 25-30.

[2] Watanabe S., Cano N. F., Carmo L., Barbosa R. F., Chubaci J. High- and very-high dose dosimetry using silicate minerals (2015). Rad. Meas., v. 72, p. 66-69.