

Study of Chemical Composition and Radiation Attenuation Properties of Quartzite of Pouma-Cameroon

In Cameroon, the quartzites mined in the locality of Pouma are frequently used as decorative stones for the interior and exterior embellishment of residential houses. We wanted to know if these beautiful decorative stones could also be good gamma attenuators, in which case, they could be used in hospitals, and research centers, to cover the walls of rooms in which we could store devices producing ionizing radiation. Thus, one could combine the useful with the pleasant by exploiting both the beauty of these stones and their power of attenuation. Since their purchase price is extremely low, we could at the same time significantly reduce the cost of fitting out a radiation shielded room. To achieve this, nineteen (19) rock samples were collected from four (04) sites. The analysis of their chemical compositions was done using an energy dispersion spectrometer SPECTRO XEPOS version 5 belonging to the National Agency for Radioprotection (ANRP) of Cameroon. The mass attenuation coefficients were obtained in the standard energy range (1 KeV at 100 GeV), from the tabulated values, contained in the XCOM database, accessible by internet on the website of NIST (National Institute of Standards and Technology) agency, owned by the United States Department of Commerce. It appears from this study that the quartzite Pouma are mainly composed of SiO₂, Al₂O₃, K₂O, Fe₂O₃, CaO and P₂O₅. Dense, high atomic number materials such as iron, lead or uranium exist in puma quartzites, only in the form of traces, making them very poor attenuators of gamma radiation. Consequently, they can be used to decorate rooms, but not to attenuate gamma radiation.

Primary author: BONGUE, Daniel (Centre for Atomic Molecular Physics and Quantum Optics (CEPAMOQ) - Faculty of Science - University of Douala - Cameroon)

Presenter: BONGUE, Daniel (Centre for Atomic Molecular Physics and Quantum Optics (CEPAMOQ) - Faculty of Science - University of Douala - Cameroon)

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