



Bluish granites from Extremadura (Spain): a radiological evaluation.

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We have found in the area of Trujillo (Extremadura, Spain) a variety of striking bluish granites, outcropping within the Plasenzuela pluton. They are all quarried under different names and are characterized by leucocratic minerals such as quartz, feldspar (both potassium and plagioclase), sometimes giving a fenocrystic texture and muscovite, with some biotite. As accessory phases, idiomorphic tourmaline is found. Recently a bluish phosphate distributed in the whole rock was detected, included within most mineral phases and fillings from stressed structures that are cutting the rock. We attribute the bluish color of the granites to this phosphate. Although biotite is almost always transformed to chlorite, the rock gives an excellent response to be polished. Physico-mechanical properties make this bluish granite a perfect option for most applications. Absorption coefficient is rather low and alteration by thermal changes has not been observed. A secondary facies with yellow colour also occurs, spatially close to the topographic surface, and probably represents an alteration product of the original granite. This facies is also commercialized as ornamental stone. A radiological survey was carried out in the field, using a gamma ray spectrometer. The radiological background is quite homogeneous in the pluton, without significant differences between gamma ray fluxes of both facies (altered and non altered). The average contents of U, Th and K₂O determined in situ with the spectrometer are 7.4 ppm, 0.8 ppm and 3.67%, respectively (n=15). Using U as a Ra proxy, the I index of the EU technical document 112 can be determined, and results in a value of 0.64 for the referred composition. This implies that the rock can be used without any restrictions for building purposes. However, a marked difference was observed in radon exhalation tests carried out in laboratorial facilities. The dominant blue variety shows radon exhalation rates comprised between 0.02 and 0.04 Bq.kg⁻¹.h⁻¹ (n=5), which are relatively low values for granitic lithologies, while the yellow one shows radon exhalation rates one order of magnitude higher, comprised between 0.19 and 0.23 Bq.kg⁻¹.h⁻¹ (n=3). Since the uranium contents do not differ between the two varieties, these results can be only interpreted through a marked difference in the mineralogical distribution of U, being a large proportion of this element not confined to accessory minerals in the yellow variety as a result of the alteration processes that affected the rock.