

Red mud as potential building material

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Nowadays, the building industry reusability studies of by-products mainly accumulated in radioisotopes of natural origin, and generated in large amounts during technological processes are frequent. In order to decrease and prevent the increment of the population's radiation exposure building materials are qualified from a radiological aspect in most of the countries. During processing bauxite large quantities of red mud are produced, which includes almost all the amount of radionuclides present in the original bauxite. Based on preliminary surveys red mud is suitable for usage in producing and colouring building industry ceramics, and producing special cements.

In Hungary, bauxite had been processed in three plants before, while a total of 58 Mt of red mud had been produced, which had been placed in cassettes.

During our work the red mud samples' radionuclide concentration values were identified (Ra-226: 330 (105-700) Bq/kg, Th-232: 262 (92 – 545) Bq/kg). Taking index I on building materials into consideration the ratios making it suitable for brick production were studied. Based on our results it was found that the limit recommended for annual gamma-dose (1 mSv/year) is accomplished by a mixing ratio of 20 %.

Since besides the gamma-dose radon may be another potential source of radiation the radon emanating and radon exhalation capacities of red mud were measured in relation to heat-treatment.

Sample bricks were burnt on test bodies with mixed-in pore increasing materials (saw-dust). It was found that at about 900°C the degree of vitrification that is pore closing is so high that radon exhalation is considerably decreased.

On the whole it was found that red mud may be used for producing bricks and other building ceramics in an appropriate ratio, and it does not cause a radiation exposure to the population higher than the dose limit recommended by the EU.