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NATURAL RADIOACTIVITY IN IMPORTED CERAMIC TILES

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Ceramic tiles are one of the commonly used decorative building materials. Body of ceramic tiles is a mixture of different raw materials including clays, quartz materials and feldspar. The body may be glazed or left unglazed. Due to the presence of zircon in the glaze, ceramic tiles can show natural radioactivity concentration significantly higher than the average values for building materials. This study contains a summary of results obtained by a survey on imported ceramic tiles which were analyzed in radiation and environmental protection department, Institute Vinča. The survey consisted of measurements of concentrations of natural radionuclides using gamma spectrometer. Based on the obtained concentrations, gamma index, radium equivalent activity, the indoor absorbed dose rate and the corresponding annual effective dose were evaluated to assess the potential radiological hazard associated with these building materials.

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THE RELATIONSHIP BETWEEN FLY ASH-BASED GEOPOLYMER STRENGTH AND MAJOR STRUCTURAL ELEMENTS

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Geopolymers are relatively new type of inorganic binder materials, which can partly substitute Portland cement. Application of geopolymer binders is very favorable from ecological point of view for two reasons: because of considerably lower amount of carbon dioxide formed during production of geopolymer binders (compared to Portland-cement production) and because waste materials, such as fly

ash, can be used as raw material for geopolymers production. One of the most limiting factors for wider use of geopolymers is the fact that production of fly ash-based geopolymers often requires curing at elevated temperature (up to 100°C). This article is focused on investigation of the strength development and changes in the microstructure of fly ash-based geopolymers cured at room temperature up to 180 days. The differences in microstructure between geopolymer samples at different ages were characterized by scanning electron microscopy (SEM/EDS) and correlated to the mechanical properties. It was established that the most significant geopolymer strength gain as well as the greatest microstructural changes occurred within the first 28 days of reaction. After this initial period, less significant changes of fly ash-based geopolymer strength and microstructure were observed.

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SYNTHESIS PROCEDURE AND PROPERTIES OF $NiFe_2O_4 - BaTiO_3$ COMPOSITES

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$NiFe_2O_4$ (NF) powder was prepared by auto combustion method starting from nickel and iron nitrates. After the process of self-ignition, fine precursor powder was thermally treated and forming the nickel ferrite powder. XRD analysis proved the formation of well crystallized nickel-ferrite cubic spinel structure.

Cubic barium titanate (BT) powder was prepared by soft chemical method (modified Pechini process).

Composites (NF-BT) with the general formula x $NiFe_2O_4$ – (1-x) $BaTiO_3$ (x = 0.2, 0.3, 0.5) powders were prepared by mixing previously obtained powders of nickel ferrite and barium titanate in planetary ball mill. As a milling medium were used tungsten carbide balls and iso-propanol. Powder was pressed and sintered at 1170 °C for 4 h and from X-ray measurements the presence of NF and BT phases was detected. No secondary phases were found. Magnetic measurements of composite materials were carried out. Saturation magnetization moment of composite materials decrease with barium titanate amount and the fields at which saturation occur increase with BT content. The coercivity H_C (Oe) increases with barium titanate concentration in obtained multiferroic material.