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The Long-Term Leaching Behaviour of 137Cs, 60Co and 152Eu Radionuclides Incorporated in Mortar Matrices Made from Natural Aggregates and Recycled Aggregates

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Abstract : During the interim storage or final disposal of low level waste, migration/diffusion of radionuclides can occur when the waste comes in contact with water. The long-term leaching behaviour into surrounding fluid (demineralized water) of ¹³⁷Cs, ⁶⁰Co and ¹⁵²Eu radionuclides, artificially incorporated in mortar matrices made from natural aggregates (river sand) and recycled radioactive concrete was studied. Results presented in this work are obtained in two years of mortar testing and will be used for the safety increasing in the storage of low level radioactive waste. The study involved the influence of curing time, type and size distribution of the aggregates on leaching behaviour. The mortar samples were immersed in distilled water for 30 days. The leached activity of the mortar samples was measured on samples from the immersing water and analyzed through a gamma-ray spectrometry method using an HPGe detector with a GESPECOR code for efficiency evaluation. The long-term leaching behaviour of the radionuclides was evaluated from the leaching data calculating the apparent diffusion coefficient.

Keywords : gamma spectrometry, leaching behavior, reuse and recycling of radioactive concrete, waste management
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