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Interaction of 137Cs with synthetic geopolymer and cementious materials

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When nuclear facilities, all types of radioactive waste are generated, including intermediate and highly active radioactive waste, which cannot be disposed of in current radioactive waste repositories in the Czech Republic. Therefore, it is necessary to find filling materials used in deep repositories that are environmentally safe for a long time. The aim of the ALMARA project is to study and test these materials.

The subject of this work is the sorption of cesium in cementitious materials and synthetic geopolymers, the determination of the equilibrium time required for the sorption of 137 Cs. The batch experiment was carried out with a solution of 137 CsCl in synthetic granite water on a synthetic geopolymer, hardened cement paste, cement mixed with iron nanoparticles (1% by weight) or bentonite (20% by weight). These materials were used in two different particle sizes (mesh fractions less than 0.5 mm and mesh fractions between 1 and 2 mm) and two different liquid-solid ratios (5 and 10 ml/g). Partition coefficients were calculated to compare these materials.

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