# Sorption properties of $^{85}Sr$ and $^{152-4}Eu$ on $\gamma$-$Al_2O_3$

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Radionuclide $^{90}Sr$ belongs to the main fission product generated in the radioactive waste from nuclear power plant. Another important nuclide is europium which is typical member of the lanthanide series and can be utilized for prediction of behavior of other lanthanides. In this work $\gamma$- modification of aluminium oxide is prepared by novel way - indirect photochemical synthesis according to [1].

The hydrated precursor formed during UV-light irradiation of aqueous solution containing aluminium chloride, ammonium formate and hydrogen peroxide was separated using centrifugation and dried at 40 °C. The resulting white material was thoroughly grinded into a whitish fine powder, which was then calcined at 800 °C for 2 hours in air. The composition of the formed solid phase was confirmed by X-ray powder diffraction and the specific surface area was determined by nitrogen gas adsorption at 77K. The morphology of the prepared nanomaterial was characterized by scanning electron microscopy. The method used for evaluation of $\gamma$-$Al_2O_3$ retention properties was batch sorption experiment, based on contact of solid material with tracer solution under defined boundary conditions (solid/solution ratio, time, solution composition as pH and ionic strength). Table 1 demonstrates efficient sorption values for strontium and europium.

Table 1 sorption properties of selected radionuclides on $\gamma$-$Al_2O_3$; V/m=30 ml/g; T=25 °C; contact time 24 hours

| | Sr | | Eu | |
|---|---|---|---|---|
| | sorption [%] | pH | sorption [%] | pH |
| $\gamma$-$Al_2O_3$ | 96.3 | 7.9 | 99.9 | 7.9 |

References

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