DIFFUSION OF CESIUM, STRONTIUM AND ALKALINE IN MAGNESIUM PHOSPHATES SYSTEM

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Safety requirement for the storage and disposal of radioactive waste have advanced substantially over the past years. Especially these achievements are important for the nuclear industry of Ukraine. For this purpose the stable ceramic matrices for immobilization of such waste (for example, ^{137}Cs) were created. Crystalline magnesium potassium phosphates are analogs to natural phosphate minerals and have great physicochemical stability in geological medium and good isolating properties [1].

Special attention was given to the study of stability of the matrices under high temperatures and the influence of effect of electrons and gamma radiation on magnesium phosphates system.

Samples of ceramicrete with 10% of $CaSO_4$, with elements analogues of radioactive isotopes of the Hanford K-East and K-West Basins, with cesium and strontium were investigated. Diffusion in initial and irradiated of samples of ceramicrete has been studied. The irradiation of samples was carried out by electrons and γ–radiation to dose 10^8 and 10^6 Gy, accordingly.

Nuclear reactions $^{133}Cs(\gamma,n)^{132}Cs$, $^{96}Sr(\gamma,n)^{95}Sr$ and $^{23}Na(n,\gamma)^{24}Na$ have been used. Irradiation of these systems were realized by bremsstrahlung on high-current electron accelerator at energy of electrons 23 MeV and current 500 μA. Higher factors of diffusion of cesium and sodium in comparison with strontium are found out.

1. A.S.Wagh, S.Y.Jeong // J. Am. Ceram. Soc. 2003. V.86[11]. P.1838.