Contribution ID: **7** Type: **Poster**

Cementation of Liquid Radioactive Waste with High Content of Borate Salts

Thursday, 15 May 2014 17:30 (1h 15m)

The report reviews the ways of optimization the cementing of boron-containing liquid radioactive waste.
The most common way to hardening the low-level liquid radioactive waste (LRW) is the cementing. However, boron-containing liquid radioactive waste with low pH values can not be cemented without alkaline additives, to neutralize the acid forms of the borate compounds. Cement setting without additives, happens only on the 14-56 day, the compounds have low strength, and hence an insufficient reliability of the radionuclides fixation in the cement matrix. The alkaline additives increase the volume of the final cement compound that enhances the financial and operational costs.
The physical and chemical methods of accelerating setting and hardening of cement compounds, containing boron compound aqueous solutions with low pH and determined the main components of the liquid radioactive waste, which prevent the hardening. To control the speed of hardening the cement solution with a boron-containing liquid radioactive waste and removing the components, that prevent hardening of the cement solution, it is proposed an electromagnetic treatment of the liquid radioactive waste in the eddy layer of the ferromagnetic particles.
The results of the infrared spectroscopy show, that the electromagnetic treatment of liquid radioactive waste changes the ionic forms of the borates and raises the pH due to the dissociation of the oxygen and hydrogen bonds in the aqueous solutions of the borate compounds.
It has investigated the various types of the ferromagnetic activators of the eddy layer, including the highly dispersed nano-powders and the magnetic phases of the iron oxides.It has determined the technological parameters of the electromagnetic processing of liquid radioactive waste and the subsequent cementation of this type of liquid radioactive waste.
By using the method of scanning electron microscopy it is shown, that the nano-particles of magnetic phases of the ferric oxides are involved in the phase formation of hydro-aluminum-calcium ferrites in the early stages of the hardening and improving the strength of the cement compounds with liquid radioactive waste.

Primary author: Dr ГОРБУНОВА, Ольга (ФГУП ”РАДОН”)

Presenter: Dr ГОРБУНОВА, Ольга (ФГУП ”РАДОН”)

Session Classification: Poster Session - Chemistry of Nuclear Fuel Cycle / 1st ASGARD International Workshop

Track Classification: Chemistry of Nuclear Fuel Cycle / 1st ASGARD International Workshop