

SibFU scientists came up with innovative way to prepare nuclear waste for disposal

The innovative technology of preparation for the safe storage of radioactive waste (RW) obtained from the processing of spent irradiated nuclear fuel (SNF), was developed by scientists of Siberian Federal University.



Today, the safest way to handle radioactive wastes is to dispose them for a long time after a special treatment and conditioning process. One of the problems of this process is the presence of sparingly soluble sediments in the pulp — waste in the liquid state, which must be recovered from the waste storage prior to the disposal.

As explained by one of the authors of the study, Professor of SibFU, Doctor of Technical Sciences Vladimir Kulagin, with the collapse of cavitation microbubbles in the process of cavitation treatment of sparingly soluble substances in water, due to a change in its physicochemical properties (activation) and other effects, for example, the formation of high-pressure fields, temperatures and impacts, even such strong minerals as diamond are destroyed.

The method, developed by scientists of SibFU, allows destroying dense, water-insoluble formations, which is deposited on the bottom of a reservoir with SNF, with erosion of sediments with acid solutions based on cavitation-activated water.

"Our method provides an increase in the velocity of dissolution and the volume of recovered deposits by about 1.5 times in comparison with the traditional method. And when mixed in a cement matrix cavitation treatment of water in the production of cement compound with the inclusion of waste of radiochemical production, it leads to an increase in the strength of the cement stone by 2-3 times in comparison with the preparation of the solution in a usual way,"
— said **Vladimir Kulagin**.

According to him, studies with real and model pulp were conducted in the laboratories of the Mining Chemical Combine in Rosatom in Zheleznogorsk (Krasnoyarsk Territory), and experiments on cavitation treatment of water in the laboratory of Siberian Federal University.

"Preliminary results on the decontamination of radioactively contaminated equipment have already been obtained and they confirm that cavitation technology in this area of handling particularly hazardous wastes is perspective, for example, when decommissioning nuclear facilities. There is also a preliminary agreement to continue these works and expand the range of tasks using cavitation," — concluded **Mr. Kulagin**.

The scientists of SibFU published the paper about their work in the journal "Chemical and Oil and Gas Engineering", which was published in the USA in the journal Chemical and Petroleum Engineering, a translation version of the Russian journal.

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