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Purification of Aqueous Solutions from Salts and Radionuclides

The paper presents the technology of industrial waste purification based on the use of natural mineral bentonite sorbent with a large specific surface area, achieved by a cavitation crushing method, partially up to nanosize particles. The possibility for the purification of liquid radioactive waste (LRW) is shown by the example of floor drains with a significant content of salts, as well as organic mineral oils and surface-active substances. In addition to sorption of radionuclides, the used nanostructured sorbent has the ability to sorb heavy metals, salts, borates.

The proposed technology contains several stages: ultrasonic treatment of ozonized LRW with the addition of sorbent; centrifugation or precipitation of the resulting mixture; obtaining a sorption-crystalline precipitate and condensate by evaporation. The final stage of processing - evaporation and vitrification in detail in this paper are not considered.

The research presents the method of purification of actual LRW solutions for subsequent treatment with sorption-crystalline concentrate for vitrification. Coefficient of activity decrease equals to 10^3 . The cost of technology is negligible, because it is based on the use of cheap bentonite. The proposed method can be used also for cleaning general industrial waste.

Keywords: liquid radioactive waste, industrial waste treatment, drainage water, surfactants, sorption-oxidation technology.