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THE MAIN PHYSICAL AND CHEMICAL PROPERTIES OF THE RADIOACTIVE PARTICLES EJECTED INTO THE ATMOSPHERE AT ACCIDENTS

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Abstract: *Physical and chemical properties of radioactive matter which get to the atmosphere at accidents on the examples of accidents at Chernobyl and Fukushima nuclear power plants has been analyzed. The properties determining sedimentation intensity of radioactive matter by an atmospheric precipitation has been analyzed. The chemical composition and superficial properties of the radioactive matter released into the atmosphere has been determined by the accident mode process. The radioactive matter (emissions) has been shown to mainly consist of gaseous inert ^{133}Xe, chemically inert "hot particles" in the form of a $U_xO_y + ZrU_xO_y$ alloy, microparticles (organic and nonorganic) of dust with vapors of I_2, TeO_x, CsO_2 radioactive matter condensed on their surface, and microparticles of radioactive graphite.*

Keywords: *Fukushima, Chernobyl, Nuclear plant accident, Radioactive particles, Radioactivity-induced charge, Radioecology, Raindrop, Coagulation, Intensity of excretion.*

INTRODUCTION

Emission in the atmosphere of radioactive matter at large accidents at the objects of nuclear power is possible. Chernobyl Nuclear Power Plant accident (Chernobyl accident) in Ukraine and Fukushima Dai-ichi Nuclear Power Plant accident (Fukushima accident) in Japan are the most large accidents for all history. These accidents have been considered as an example. A large amount gaseous and aerosol radioactive matter falls into the atmosphere as a result of emergency depressurization of a nuclear reactor [1, 2]. Under the influence of convective airflows radioactive matter falls into the top layers of the troposphere and propagation at the long distances. Radius of a zone of radioactive contamination as a result of Chernobyl accident makes about 1500 km [3, 4]. Contamination zone at accident in Fukushima makes 150 km [5]. However the raised background of radiation has been registered at much bigger distance, for example in Norway [2, 6]. The sizes and form of zone contamination have been defined by weather conditions, a district landscape, existence of vegetation, density of buildings and some other factors. Much attention in [7 – 9] has been given modeling of dynamics change of a contamination zone. Atmospheric precipitation over an accident zone significantly reduces the sizes of contamination area and the radiation background. It makes owing to sorption by water drops of radionuclides. Process intensity of radionuclides sorption and purification intensity of the atmosphere from radionuclides depend to aggregate state of radionuclide, its dispersion, and also physical and chemical properties radioactive [10 – 12]. Besides, in articles [13 – 15] it has been determined that radioactive particles can accumulate