



Contribution ID: 900

Type: Poster

## Study of the radiation influence on the characteristics of specialized concretes used in the construction of nuclear power plants

In the design and construction of nuclear power plants, a number of specialized concretes are used, such as TsKS, TsKS-M, OKA and OKA-M. However, concrete properties and project strength characteristics may change during nuclear power plant operation (design value is 60 years) under the radiation influence. Therefore, the aim of this work is the study of characteristics of specialized concrete under the radiation influence. The maintaining of the properties and characteristics of concrete specified in the design of nuclear power plant directly affect the justification of NPP safety and, accordingly, the NPP accident (severe and beyond design basis accidents) propagation paths.

The test samples of concrete were produced and the drying modes were worked through as a result of the experimental studies. Samples were irradiated in the IRT-T research reactor. The properties of concretes are determined:

- compressive resistance;
- the amount of free and combined water in concrete;
- density, porosity, water absorption;
- thermal conductivity compressive resistance after thermal influence.

The studies of concrete samples with OS-51-03 coating were singled out as a separate series of experiments. Organosilicate coating OS-51-03 is widely used in the design and construction of nuclear power plants in order to protect against radiation.

Coating with an organic composition (OS-51-03) of concrete samples, and their subsequent heat treatment leads to a significant increase in compressive strength for all concrete compositions. The increase in strength in the low-temperature range from 200 to 600°C is associated with the sealing of the sample surface during the drying of the organic composition and the creation under the impermeable film of conditions close to the conditions of heat and moisture treatment (steaming), which significantly intensifies the synthesis of the main phases of cements, providing an increase in strength. Further, with raise of temperature, complete burnout of organics from the organic composition occurs.

Thus, can be said about the prolonged maintaining of the concrete properties (tensile strength) when exposed to temperatures up to 600°C.

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**Session Classification:** Radiation Chemistry

**Track Classification:** Radiation Chemistry