

# International Conference on Fast Reactors and Related Fuel Cycles: Next Generation Nuclear Systems for Sustainable Development (FR17)



Contribution ID: 134

Type: POSTER

## Results of old and program of new experiments on the small-sized fast multiplying systems with HEU / LEU fuel for receiving the benchmark data on criticality

Wednesday 28 June 2017 17:50 (1h 10m)

Benchmark criticality experiments on small-sized fast multiplying systems with HEU fuel were performed using “Giacint” critical facility of the Joint Institute for Power and Nuclear Research – Sosny of the National Academy of Sciences of Belarus. The critical assemblies’ cores comprised fuel assemblies, each of which consisted from 19 fuel rods of two types and had no the clad. The first one is metallic U (90% U-235); the second one is UO<sub>2</sub> (36% U-235). The active area length is 500 mm. The clad material is stainless steel. Three types of fuel assemblies with different content fuel rods were used. Side radial reflector: an inner layer –Be, an outer layer –stainless steel. The top and bottom axial reflectors –stainless steel. The analysis of the experimental results obtained from these benchmark experiments by developing detailed calculation models and performing simulations for the different experiments is presented. On “Giacint” critical facility are being prepared benchmark criticality experiments on multiplying systems modeling physical features of cores with LEU fuel for use in works on fast reactors with gaseous and liquid-metal coolants. Critical assemblies represent uniform hexagonal lattices of fuel assemblies, each of which consist from 7 fuel rods and do not have the clad. The fuel is UZrCN (19.75% U-235). The active fuel length is 500 mm. The clad material is stainless steel or Nb. Three types of fuel assemblies with different matrix material (air, aluminium and lead) were investigated. Side radial, top and bottom reflectors –Be (internal layer) and stainless steel (external layer). The description of construction and composition of critical assemblies, the results of calculation and the program of works on critical assemblies are presented.

### Country/Int. Organization

Republic of Belarus / Joint Institute for Power and Nuclear Research-Sosny of NAS of Belarus

**Author:** Mr SIKORIN, Svyatoslav (Nikolaevich)

**Co-authors:** Mr KUZMIN, Andrei (General director); Mr MANDZIK, Siarhei (Senior researcher); Mr POLAZAU, Siarhei (Senior researcher); Ms HRYHAROVICH, Tatsiana (Konstantinovna)

**Presenter:** Mr SIKORIN, Svyatoslav (Nikolaevich)

**Session Classification:** Poster Session 2

**Track Classification:** Track 6. Test Reactors, Experiments and Modeling and Simulations