

## Advanced Fuel Performance Simulations using Standard and Advanced Fuel Performance Codes

I have been working as a research scientist at the Czech Technical University in Prague, Faculty of Nuclear Sciences and Physical Engineering. I have been participating in different research projects related not only to nuclear fuels and their development. I have been responsible for experimental testing, characterization and also modelling and simulation using different fuel performance codes. I was awarded with a six-month training at Massachusetts Institute of Technology at the Department of Nuclear Science & Engineering. I worked under the supervision of professor Ballinger and closely cooperated with the group of Koroush Shirvan who is developing advanced types of nuclear fuels.

The main purpose of my training was to extend my knowledge in the field of advanced fuel performance simulations using standard and advanced fuel performance codes as FRAPCON/FRAPTRAN or Bison. I worked on a development and implementation of a new mechanical model for fuel performance codes and used other codes for code-to-code comparison. Our main responsibilities were however related to experimental work. I had a chance to work on several experiments namely: steam oxidation, high-temperature steam oxidation, quench test, pressurization test, and 4-point bend test. I was



also trained in a characterization of samples using SEM, FIB, XRD or nanoindentation techniques.

After returning to my home institution I will be able to build similar experimental facilities at the CTU. These facilities can be used for research purposes as well as for student tutoring. The new skills will increase the competences of my home institute in the field of nuclear fuel development and quality of research in general. I will continue development of nuclear fuels with enhanced accident tolerance with a focus on VVER reactors which are in operation in the Czech Republic. By developing advanced types with increased accident tolerance, my work and its results will contribute to the safer operation of nuclear reactors around the world.

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