

MOLTEN SALT REACTORS TAXONOMY AND FUEL CYCLE PERFORMANCE

J. KREPEL
Paul Scherrer Institute (PSI)
Villigen, Switzerland
Email: jiri.krepel@psi.ch

Abstract

Molten Salt Reactors (MSR) utilize molten salt in their core. Especially, when it is used as a fuel carrier, it provides enormous designing freedom. Consequently, there are many concepts available in the literature; some more matured than others. Recently there was a common effort at IAEA to classify these concepts and create MSR taxonomy. This taxonomy will be briefly introduced together with the reactor physics characterization of the major MSR classes and families. Particular MSR features will be discussed and listed together with the involved families.

The fuel cycle performance will be evaluated from neutronics perspective. It will include discussion about cross-section of applicable material for MSR construction. Several MSR families will be classified according to the breeding gain and applicable fuel cycles.

Last but not least, salt composition and distribution in the MSR system during its operation will be presented together with an initial assessment of possible radionuclides release during accidental conditions.