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Multi-criteria comparison of the efficiency of minor actinides burning in different nuclear reactors based on the INPRO/IAEA KIND approach

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This paper presents a comparison of the efficiency of minor actinides (MA) burning in various type of nuclear reactors with a fast neutron spectrum. A set of criteria for comprehensive comparison of reactor technologies, based on the INPRO/IAEA KIND approach to multi-criteria assessment, has been prepared. This set of criteria includes indicators in such areas as the efficiency of MA burning, economics, safety, environment, readiness of reactor technology and infrastructure for its implementation. The evaluation and comparison procedure was carried out using the KIND-ET tool. It is shown that a comprehensive multicriteria analysis of various aspects of the technologies, as expected, led to estimates that differ from the approach in which technologies are compared only single criterion and without taking into account the influence of other equally important factors. And the cumulative assessment of technologies largely depends on the set development objectives. This means that each of the listed options can take the first place in the rating when certain priorities are selected.
Keywords: multi-criteria evaluation, sodium fast reactors, lead fast reactors, MSR, technology comparison, project KIND, IAEA, INPRO.

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