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Identification of important phenomena under sodium fire accidents based on PIRT process

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Since sodium has high chemical reactivity with oxygen and moisture, sodium fire accident is one of key issues in sodium-cooled fast reactor (SFR) plants when the sodium leaks out of a coolant circuit. In order to evaluate the consequence of the sodium fire event numerically, JAEA has developed sodium fire analysis codes such as SPHINCS and AQUA-SF. This paper describes a PIRT (Phenomena Identification and Ranking Table) process for a sodium fire event. The present PIRT is aimed to utilize for validation and improvement of the sodium fire analysis codes. Because a sodium fire accident in an SFR plant involves complex phenomena, various figures of merit (FOMs) for importance ranking could exist in the PIRT process. Therefore, the FOMs are specified through factor analysis. Associated phenomena in a sodium fire event are identified through the element- and sequence-based phenomena analyses. Then importance of each associated phenomenon is evaluated by considering the sequence-based analysis of associated phenomena related to the FOMs. Finally, we have established the ranking table through the factor and phenomenon analyses.

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