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Numerical Investigation of Sodium Spray Combustion Test with SPHINCS code

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As a collaboration on the field of advanced reactor modeling and simulation in Civil Nuclear Energy Research and Development Working Group (CNWG) between Japan Atomic Energy Agency (JAEA) and Sandia National Laboratory (SNL), information exchange of sodium combustion modeling and experimental data has been carried out.

In the collaborative work, a benchmark analysis of Surtsey spray combustion experiments done by SNL has been conducted using SPHINCS code at JAEA and CONTAIN-LMR code at SNL. In this paper, the numerical result of SPHINCS code and the comparison between SPHINCS and CONTAIN-LMR codes are discussed. Furthermore, sensitivity analyses have also been carried out to investigate the influential factor on the experiments. As a result, it is demonstrated that the average droplet diameter of sodium spray has a strong influence on the gas temperature and pressure peaks appearing at an early stage on the experiment. On the other hand, parameters concerning with the pool combustion model affect the experimental result at the later stage.

Country/Int. Organization

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