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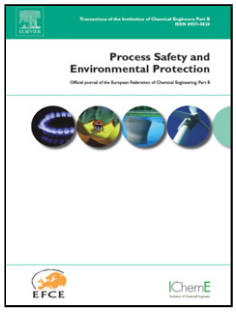

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Numerical and experimental studies on decomposition and vent of di-tertbutyl peroxide in pressure vessel

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Highlights

- Creation of CFD model for thermal decomposition and vent of DTBP.
- Combination of the kinetic model and CFD model.
- Fluid dynamic behavior in the decomposition and vent process is revealed.
- CFD simulation can be applied to provide a supplement to the experiment.

Abstract: Study of thermal decomposition and vent of di-tertbutyl peroxide (DTBP) is beneficial for accidents prevention in chemical engineering. In order to deep understand the thermal decomposition and vent behaviors of DTBP in a pressure vessel, both computational fluid dynamics (CFD) simulation and pressure vessel tests (PVT) were carried out. Based on the DTBP decomposition kinetics evaluated from differential scanning calorimeter (DSC) experiments, CFD numerical simulation was performed to reveal the fluid dynamic behaviors, temperature profile and flow field during the thermal decomposition and vent processes. PVT experiments were conducted to validate the numerical model. The results showed that the simulated and experimental data were in good agreement, thereby proving the validity of the numerical model and the DTBP decomposition kinetic model.