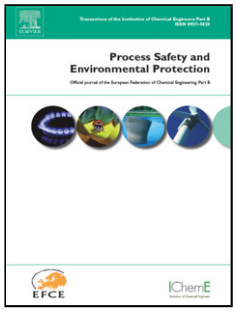

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Thermal safety assessment for catalytic decomposition of hydrogen peroxide by dynamic analysis

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Abstract

The goal of this research was to identify, characterize, and gain insight into the oscillatory thermal instability of hydrogen peroxide decomposition reaction. The experimental data, previously reported by Wirges (Chem. Eng. Sci., 35 (1980) 2141), were reexamined using a rigorous dynamic analysis. All possible bifurcation states were defined: the thermal stability regions (unique and multiple solutions), instability states (bifurcation points, saddle node bifurcations), and turning points (limit and oscillatory behavior). The geometric interpretation of each of these states, as they can be found in practical applications, was presented. The obtained results revealed a predominant thermal oscillatory behavior and high sensitivity to small fluctuation of dynamic parameters. Finally, complete information about the