Thermal runaway hazards of base-catalyzed cleavage of cumene hydroperoxide

Hung-Yi Hou
Department of Occupational Safety and Health, Jen-Teh Junior College of Medicine, Nursing and Management, 1, Jen-Teh Rd., Houlong, Miaoli, Taiwan 35664, ROC
E-mail address: g9310812@yuntech.edu.tw

Abstract

Many studies have been performed to clarify the basic thermal runaway hazards and kinetics of cumene hydroperoxide (CHP) decomposition properties. However, the incompatible characteristics of CHP have not been clearly identified yet. Alkaline solution has been used as a catalyst during base-catalyzed process to form the economic products, dimethylphenyl carbinol (DMPC) and dicumyl peroxide, (DCPO) but it also affected the reactive temperature of reaction or storage, even as low as ambient temperature. More efforts are proceeding in this study by thermal calorimetry, differential scanning calorimetry (DSC) and vent sizing package (VSP2) to compare the incompatible hazards among various alkalines with CHP in cumene itself: runaway traces, exothermic onset temperature, self-heating temperature, pressure-rising rate, and heat of decomposition were measured and assessed. These results are essentially important in process safety design for producing CHP and its derivatives.

Keywords: thermal runaway hazards; cumene hydroperoxide (CHP); base-catalyzed process; thermal calorimetry; alkalines