Study on Decomposition Mechanism of Solid and Application in the SADT Prediction using highly Sensitive Calorimeter

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Abstract:

Although plant experience is essential, it is possible to assess the hazard of large scale process operation using a logical process based on experimental data. This paper reports an analytical procedure to characterize the reactions and the decomposition kinetics for organic peroxides or similar materials near their self-accelerating decomposition temperature (SADT) by means of isothermal calorimetric data. But it requires a high sensitivity of the method to detect very slow reaction where autocatalysis or some physical phenomenon may take place. So the thermal activity monitor (TAM) with the detection limitation of 50 nJ was used to measure the heat flux of two samples, benzoyl peroxide (BP) and lauroyl peroxide (LPO). And consequently SADT values for two different reactions are evaluated.

Keywords: Decomposition Mechanism, isothermal, self-accelerating decomposition temperature

Fig.1. Reaction curves of BPO in the TAM

Fig.2. Reaction curves of LPO in the TAM