Risk Evaluation on the Basis of Pressure Rate Measured by Automatic Pressure Tracking Adiabatic Calorimeter

Y. IWATA and H. KOSEKI
National Research Institute of Fire and Disaster, 14-1, Nakahara 3-Chome, Mitaka, Tokyo 181-8633, Japan
E-mail: iwata@fri.go.jp

Abstract

An automatic pressure tracking adiabatic calorimeter (APTAC) had been developed to obtain the thermokinetic and vapor pressure data during runaway reactions. The APTAC is an adiabatic calorimeter with a large-scale sample mass and low thermal inertia, and is an extremely useful tool for assessing thermal hazards of reactive chemicals. The data obtained by the APTAC is important information for the design of the safe industrial process.

The pressure rate is important data for designing the relief vent of a reactor. The pressure and pressure rate were examined on the basis of the pressure data of di-tert-butyl peroxide (DTBP)/toluene solution with various weights and concentrations. The time history of the gas production was examined with various weights and concentrations. The gas production index which is one of the intrinsic properties is 1.3 in the DTBP decomposition of 40wt.%. This value is nearly the same as the literature value.

Keywords: thermal decomposition; automatic pressure tracking adiabatic calorimeter; pressure rate; gas production index, di-tert-butyl peroxide