Thermal Hazard Assessment about Reaction of Ozone Oxidation 2-Butene-1,4-diol diacetate by RC1

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Abstract

The exothermic reaction of ozone oxidation 2-butene-1,4-diol diacetate was analyzed by RC1 in semi-batch operation. Heat releasing rate and heat conversion were studied with different operating conditions, such as setting temperature, ventilation rate, and so on. The adiabatic temperature rising was derived from the measured calorimetric data. Results indicated that the reaction was divided into two stages. With decrease of reaction temperature, heat releasing rate accelerating, reaction time exothermic heat increase. With increase of ventilation rate, heat releasing rate significantly increase and reaction time decrease. When ventilation rate was 150L/h, exothermic heat reached maximum, which might be result from gas participating in the reaction reached saturation. If ventilation rate unceasingly increased, abundant gas might take away the releasing heat, so that exothermic heat decreased. The runaway severity of the reaction was high and the process operation parameters must be adjusted.