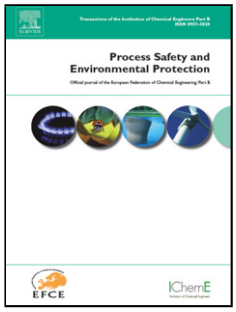

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PII: S0957-5820(18)30084-3
DOI: https://doi.org/10.1016/j.psep.2018.03.030
Reference: PSEP 1336

To appear in: *Process Safety and Environment Protection*

Received date: 20-6-2017
Revised date: 19-3-2018
Accepted date: 26-3-2018

Please cite this article as: Vianello, Chiara, Salzano, Ernesto, Maschio, Giuseppe, Thermal behaviour of Peracetic Acid for the epoxydation of vegetable oils in the presence of catalyst.Process Safety and Environment Protection https://doi.org/10.1016/j.psep.2018.03.030

Thermal behaviour of Peracetic Acid for the epoxydation of vegetable oils in the presence of catalyst

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Abstract

Peroxyacids are commonly used in chemical processing, synthesis and bleaching. Recently, they have been demonstrated to be very versatile for the epoxidation of unsaturated oil, aiming at the synthesis of polyepoxides (plasticizer, resins and adhesives). These processes are characterized by high yields and selectivity. However, due to their hazard and instability, the peroxy reactants are often obtained from the corresponding organic acid *in situ* by combination with Hydrogen Peroxide, in the presence of a mineral (Sulphuric or Phosphoric) acid as catalyst.

The aim of this study is to analyze the thermal stability of the catalytic system used for vegetable oil peroxidation with the purpose of operating under safety conditions and then identify the safety parameters necessary to prevent the runaway reaction.

This paper presents the study of the decomposition of peroxyacetic acid in aqueous phase by using a Thermal Screening Unit. Also, the effect of the presence of the acid catalysts was analyzed.

Keywords: Peracetic Acid, Decomposition, Runaway reaction, Thermal Risk, Kinetic

1. Introductions

In the last years, environmental concerns, the limited reserves of fossil fuel and the market pressure have increased the interest towards the use of more selective, less dangerous materials and the use of renewable raw materials. Peroxyacids is an organic peroxide in which the Carboxylic group is transformed to a Peroxycarboxylic group. It is a strong oxidant with a reduction potential larger than those of well-known oxidant, such as chlorine (Kitis, 2004). At different operating conditions,