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Book Review

Jörg Steinbach: Chemische Sicherheitstechnik. VCH-Verlagsgesellschaft, Weinheim, New York, Basel, Cambridge, Tokyo 1975

In recent years, the field of chemical safety, the integral view of process safety of chemical plants in particular, has increasingly gained in importance, not least as a consequence of recent spectacular incidents. The monograph by J. Steinbach on this subject is therefore to be especially welcomed. The author has been active in the chemical industry for many years and, considering his profound knowledge of the practical requirements in the process industry, is therefore particularly qualified to present this field of work to those concerned with the safety of chemical plants.

After a short introduction into the fundamentals of safety engineering and a discussion of the life time of a chemical process from the laboratory scale to the pilot plant to the production plant, the stability of substances is discussed. The methods commonly used to evaluate the stability of substances, such as differential thermoanalysis (DTA) or differential scanning calorimetry (DSC), are described in detail.

Emphasis is of course placed on exothermic chemical reactions. Starting from the basic reaction techniques, the different cooled reactor types such as batch, semibatch and continuously stirred reactors are presented and the respective mass and heat balances derived. Based on the heat explosion theories of Semenov and Frank-Kamenetzki, the cases of undisturbed normal operation and disturbed operation of a reactor are considered and the criteria for the stability and instability of the processes derived.

Apart from considering in detail runaway reactions the book also deals with other related aspects. Of particular interest are the problems of pressure relief in the case of malfunction and the design of the retention systems for the resulting mass flows. In this context the type of mass flow, the occurrence of two phase flows of gas/vapour and liquid in particular, and the design of the retention systems (retention tanks, cyclone precipitators) are specially dealt with.

Further, reference is made to the more important explosion prevention measures such as the inerting of installations and plants. The basic requirements for the prevention of dust explosions are also briefly dealt with, although in the reviewer's view somewhat too briefly. The book ends with a brief representation of the legal framework of chemical process safety.

The reviewer read Steinbach's book, which is well written and illustrated, with great pleasure. The book provides a didactically well presented and understandable account of this difficult field of chemical safety. It gives a good overview of this important area of process safety and offers plenty of good advice for practical situations.

It is interesting to compare Steinbach's book with the recent book by Th. Grewer on Thermal hazards of chemical reactions (Elsevier, Amsterdam, 1994). Both authors

present this field of work in an excellent way, from slightly different points of view: Whereas Grewer's book rather concentrates on exothermic chemical reactions and discusses in detail a large number of these reactions relevant to practice, Steinbach's book takes a somewhat wider view of chemical plant safety and places stronger emphasis on the practical implications. Thus both books with their respective excellent treatment of the same subject complement each other in an ideal way and certainly will become very soon the standard works in this field.

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