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Y. K. Godovsky: Thermophysical Properties of Polymers
Springer-Verlag, Berlin 1992
296 pp. 743 references 170 figures

The author can be considered as one of the leading scientists on the field of polymer physics.

His book presents the essential discussion of the thermal physics of polymeric materials for the first time. The area is investigated by the up-to-date tools of solid state and molecular physics, taking into account the molecular structure and macromolecular character of polymers. In the book one can find the interpretation of the basic thermal properties of macromolecular materials, furthermore, the thermal behaviour of polymer systems under deformation and fracture.

The first part deals with the basic thermal properties (heat capacity, thermal conductivity and expansion) of polymeric materials. The discussion covers the amorphous and crystalline polymers, composites treating the effects of anisotropy, temperature, radiation and pressure and giving the comparison of experimental results with theoretical concepts.

In the second part discussions are dealing with the thermomechanics of glassy, crystalline and rubberlike polymers. Additionally one can find remarkable discussions on the thermal behaviour of macromolecular systems under deformation and fracture.

Interesting to mention that the first observations of this kind were made yet by Joule in the last century, but because of the difficulties of interpretations and measurements, only few similarly good discussions were written earlier about these topics.

Furthermore, the author gives the critical description of comprehensive experimental methods in connection with areas of the discussion. One can find the limits and possibilities of adiabatic calorimetry and DSC in heat capacity measurements, the value of steady and non-steady state methods in the determination of thermal conductivity and diffusivity. Similarly the usage of different TMA instruments is shown in evaluating expansion data.

As it is well-known, the observations of heat effects following the deformation and fracture of plastics need special techniques. An interesting small review is involved in the book describing the gas calorimeters and the modifications of the 'Tian-Calvet' type heat-conducted deformation calorimeters. The author describes his contribution also, a fully automated deformation microcalorimeter based on the 'Tian-Calvet' principle.

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Akadémiai Kiadó, Budapest

The book containing the theory and practice in the needed ratio is really an essential one for those (researchers and university students) who are interested in the general and special methods of determination of thermophysical properties of polymers, and are interested in the theoretical background of the phenomena and their behaviour.

G. Balázs – J. Varga