

## Book Review

H. Kopsch: *Thermal Methods in Petroleum Analysis*, VCH Verlagsgesellschaft, Weinheim, Germany, 1995, ISBN 3-527-287 40-X; 515 pp, DM 278

This monograph is the result of the author's extended work at the German Institute of Petroleum Research. The use of commercially available instruments of thermal analysis and calorimetry offers the chance to rapidly gather, at little expense, relevant characteristic data for the processing and technical application of petroleum and its products. There are normative recommendations for certain measurement and evaluation procedures, but the complexity of the sample substances and the limitations of the measurement procedures must always be allowed for. After a brief methodologic presentation of thermogravimetry (TG) and differential scanning calorimetry (DSC), the capabilities of the procedures are described for model substances (simulated distillation, measurement in oxidizing/inert atmosphere). Following a detailed description of reaction kinetics with numerous exemplary measurements on model substances, the main part of the book deals with the thermoanalytical investigation of petroleum and petroleum products. Petroleum (a multicomponent system) – of different origins – and its products are characterized with the aid of TG (and also DSC), which allows rapid initial information about the sample substance.

The examination of refinery residues is presented by the example of 25 selected samples which were additionally characterized in respect of the softening point, penetration, the Conradson coke residue as well

as in structural terms and by their chemical composition (element analysis).

The TG measurements and the characteristic data derived from these are presented in comprehensive tables and numerous diagrams. Corresponding results with DSC measurements, including kinetic data, are also given. The investigations of bitumen and polymer modified bitumen, which are also comprehensive, are followed by the product groups heavy residues (investigation of hydrocracking), oil shales and shale oils, lubricants and silicone oils. A systematic application of thermoanalytical methods is presented for all these products.

The representation of the relation of the kinetics of pyrolysis and oxidation reactions is followed by a chapter dealing with the comparison of commercial computer programs (kinetics), which would be of great interest to the practitioner.

In this monograph, the potential of thermal analysis for the investigation of petroleum and its products is mainly described on the basis of the author's own measurements; also, the methodologic restrictions indicated follow from the author's own practical experience.

The usefulness of the results of thermal analysis with regard to the characterization of multicomponent systems and the use of the products are convincingly described. On the whole, this is a book which is indispensable for the expert engaged in this area of specialization.

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