Journal of Thermal Analysis, Vol. 37 (1991) 235-236

Book Review

Polymer Thermodynamics by gas chromatography
by R. Vilcu and M. Leca
Elsevier Science Publisher B.V. US$. 92.75; Dfl. 190.00

For many years now gas chromatography has been holding the position of an established physical separation technique for qualitative evaluation and quantitative analysis of complex organic mixtures. Its traditional application field has been extended during the past 20 years to the examination of the thermodynamic properties: gas -solid, gas-liquid interactions and structure, morphology, thermodynamic behaviour of the polymeric stationary phases and polymer solutions.

This book gives an excellent survey of the thermodynamic applications of gas chromatography in polymer characterization dealing with a number of important topics: phase transitions in crystalline-amorphous polymers and liquid crystals, second order transitions, glass transitions is polymers, determinations of diffusion coefficients, segregations of block copolymers, etc.

Chapters 1 and 2 offer a brief survey of the theory of gas chromatography. Chapter 3 summarizes the thermodynamic description of solutions trying to syntesize the most representative statistical models. The next Chapter [4] is the quatitive interpretation of the thermodynamics of direct gas chromatography. It shows how this technique can be used for studying different physical phenomena as the distribution of a component between two phases, dissolution, adsorption on the solid surface, vaporization, etc. The most important part of the book, Chapter 5 is on the thermodynamics of inverse gas chromatography. In gas chromatography the properties of an unknown sample are investigated based on its interactions with a known stationary phase. In inverse gas chromatography the substance injected is known and the properties of an unknown stationary phase can be established based on its interaction with this substance. This is the reason why this inverse GC is an excellent method for the investigation of macromolecular substances. The polymeric material is used as a stationary phase and its thermodynamic behaviour can be measured using well defined model samples. In this way a series of thermodynamics data and information about the polymers can be obtained, like the activity coefficient and partial molar

John Wiley & Sons, Limited, Chichester
Akadémiai Kiadó, Budapest

thermodynamic functions of dissolution, adsorption on the polymer surface, surface area of the polymer, melting point, melting transitions of crystalline-amorphous polymers, polymer crystallinity, glass transition, diffusion in polymers, etc.

I feel I can warmly recommend this book for all specialists in research and industry who are concerned with the modification, investigation and characterization of polymers and it is also useful to specialists who are interested in the physicochemical application of gas chromatography.

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