Book Reviews

Progress in Nuclear Magnetic Resonance Spectroscopy, Volume III

Edited by J. W. EMSLEY, J. FEENEY and L. H. SUTCLIFFE. Pergamon: Oxford, 1967. 6 in. × 9 in. 424 *pp.* 140*s* or $18.00

THE third volume of this series contains six chapters devoted to the following topics: 1. Sub-spectral analysis (P. DIEHL, R. K. HARRIS and R. G. JONES); 2. The isotope shift (H. BATIZ-HERNANDEZ and R. A. BERNHEIM); 3. Nuclear spin relaxation studies of molecules adsorbed on surfaces (K. J. PACKER); 4. Relaxation processes in systems of two non-identical spins (E. L. MACKOR and C. MACLEAN); 5. Microdynamic behaviour of liquids as studied by n.m.r. relaxation times (H. G. HERTZ); 6. Solvent effects and nuclear magnetic resonance (P. LASZLO).

This volume does not therefore contain material of direct interest to polymer scientists, although a number of concepts are discussed, such as multiphase relaxation and correlation time distributions (Chapter 3), molecular motions (Chapter 5) and solvent effects (Chapter 6) which are of importance in the study of polymer properties by magnetic resonance techniques. The first chapter describes the use of sub-spectral analysis in the interpretation of complex spectra. This method is important since it allows the maximum information to be obtained without recourse to a computer. Chapter 2 is concerned with isotope shifts in n.m.r., discussing their measurement, empirical correlation with coupling constants and molecular geometry and theoretical explanations of such effects. The next three chapters discuss the use of relaxation measurements for obtaining information about different types of physical system. Chapter 3 treats the study of adsorption on surfaces by n.m.r. relaxation methods, discussing theory and experimental results, the latter in an illustrative rather than comprehensive manner. The fifth chapter considers a very specific topic, i.e. the types of interaction leading to relaxation in liquids containing non-identical spins such as H^1 and F^{19} and the relationship of these interactions to molecular motions and signs of coupling constants. Chapter 5 is a more general treatment of relaxation times and motions in liquids with particular reference to mixtures of various sorts, e.g. pairs of organic liquids or ions in aqueous solutions. By far the largest section of the book (about one third) is the last chapter which is concerned with aspects of solvent effects in n.m.r., such as hydrogen bonding, reference standards, solvent dependence of chemical shifts and coupling constants, etc. The subject of spectra obtained from materials dissolved in liquid crystal phases is briefly dealt with, although this is more fully dealt with in Volume 2 of this series by A. D. BUCKINGHAM and K. A. MCLAUCHLAN, as the author admits. In general, this particular contribution emphasizes the empirical nature of a great many interpretations of solvent effects and the necessity for choosing systems and making measurements extremely carefully if reliable interpretations are to result.

As is often the case in books of this sort, there are condensed expositions of basic theory (e.g. Chapter 3) which ostensibly serve to make the particular article suitable for non-specialists. Possibly this purpose might be better served by references to suitable standard texts thereby avoiding duplication of material already available and providing the beginner with a less severely 'potted' introduction to the subject. However, all the chapters in this volume are interesting and useful reviews of their particular fields.

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