

Solid State NMR Spectroscopy for Biopolymers: Principles and Applications

Hazime Saitô Himeji Institute of Technology, Himeji, Japan and Hiroshima University, Hiroshima, Japan

Isao Ando Tokyo Institute of Technology, Tokyo, Japan

Akira Naito Yokohama National University, Yokohama, Japan

When considering biological significance and industrial and medical applications of biopolymers, it is crucial to know details of their secondary structure, dynamics and assembly. The biopolymers include globular, membrane and fibrous proteins, polypeptides, nucleic acids, polysaccharides and lipids. Solid state NMR spectroscopy has proved to be the most suitable and unrivalled means for investigations of biopolymers. The major advantage of solid state NMR spectroscopy is that the resulting line widths can be manipulated experimentally and are not influenced by motional fluctuation of proteins under consideration as a whole.

Solid State NMR Spectroscopy for Biopolymers: Principles and Applications provides a comprehensive account on how the conformation and dynamics of such biopolymers can be revealed by solid state NMR spectroscopy. Special efforts have been made towards the historical and chronological consequences of a variety of applications and the dynamic aspects of the biopolymer system. In particular, the authors emphasize how important it is to record the simplest DD-MAS (one pulse excitation with high power decoupling) as a means of locating very flexible portions of membrane proteins and membrane associated peptides. The authors also demonstrate that dynamic features of membrane proteins with a timescale of characteristic fast (10^8 Hz) and intermediate (10^4 – 10^5 Hz) fluctuation motions under physiological conditions can be revealed easily by specific suppression of peaks.

This book is an invaluable resource for biophysicists, biochemists and chemists, including NMR spectroscopists, structural biologists, and polymer scientists. The book provides an introduction suitable for graduate students as well as for research scientists, including those working in the pharmaceutical and chemical industries