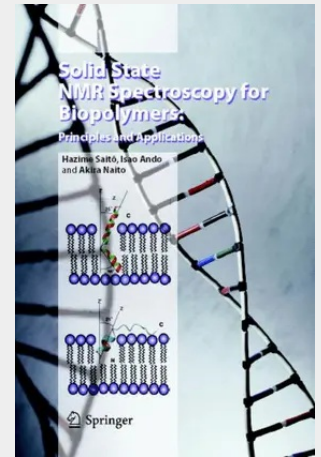


Solid State NMR Spectroscopy for Biopolymers

Principles and Applications

When considering the biological significance and industrial and medical applications of biopolymers, it is crucial to know details of their secondary structure, dynamics and assembly. Solid state NMR spectroscopy has proved to be the most suitable and unrivaled means for investigations of biopolymers. Special efforts have been made to include the historical and chronological consequences of a variety of applications and the dynamic aspects of the biopolymer system. In particular, the authors emphasise how important it is to record the simplest DD-MAS as a mean 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 fast and intermediate fluctuation motions can be revealed easily by specific suppression of peaks.

"Biopolymers" are polymeric materials of biological origin, including globular, membrane, and fibrous proteins, polypeptides, nucleic acids, polysaccharides, lipids, etc. and their assembly, although preference to respective subjects may be different among readers who are more interested in their biological significance or industrial and/or medical applications. Nevertheless, characterizing or revealing their secondary structure and dynamics may be an equally very important and useful issue for both kinds of readers. Special interest in revealing the 3D structure of globular proteins, nucleic acids, and peptides was aroused in relation to the currently active Structural Biology. X-ray crystallography and multidimensional solution NMR spectroscopy have proved to be the standard and indispensable means for this purpose. There remain, however, several limitations to this end, if one intends to expand its scope further. This is because these approaches are not always straightforward to characterize fibrous or membrane proteins owing to extreme difficulty in crystallization in the former, and insufficient spectral resolution due to sparing solubility or increased effective molecular mass in the presence of surrounding lipid bilayers in the latter.



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