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"Biopolymers" are polymeric materials of biological origin, including globular, membrane, and fibrous proteins, polypeptides, nucleic acids, polysaccharides, lipids, etc. and their assembly, although preference in respective subjects may be different among readers who are more interested in their biological significance or industrial and/or medical applications. Nevertheless, characterizing or modeling 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 in 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 spurring solubility or increased effective molecular mass in the presence of surrounding lipid bilayers in the latter.

It is a natural consequence to expect solid state NMR as an alternative means for this purpose, because major developments in the past 30 years witnessed remarkable progress of this technique. The expected NMR line widths available from achieved high-resolution solid state NMR can be manipulated experimentally and are not any more influenced by motional fluctuation of protons under consideration as a whole, in contrast to solution NMR. Accordingly, detailed structural information such as mutual orientation of molecules, internuclear distances, torsion angles, etc., is available from NMR parameters contained in solid state NMR, although most of them are lost due to time-averaging in solution NMR.

This book is intended to give a comprehensive account as to how polymorphic, secondary, and dynamic structures of a variety of the above-mentioned biopolymers are revealed by (high-resolution) solid state NMR.