



The Hydrogen Bond and the Water Molecule: The Physics and Chemistry of Water, Aqueous and Bio-Media

Yves Marechal

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The Hydrogen Bond and the Water Molecule offers a synthesis of what is known and currently being researched on the topic of hydrogen bonds and water molecules. The most simple water molecular, H₂O, is a fascinating but poorly understood molecule. Its unique ability to attract an exceptionally large number of hydrogen bonds induces the formation of a dense "hydrogen bond network" that has the potential to modify the properties of the surrounding molecules and their reactivities. The crucial role that water molecules play is described in this book. The author begins by providing an overview of the thermodynamical and structural properties of H-bonds before examining their much less known dynamical properties, which makes them appear as centres of reactivity. Methods used to observe these components are also reviewed. In the second part of the book the role played by the dense H-bond network developed by H₂O molecules is examined. First in ice, where it has important atmospheric consequences, then in liquid water, and finally in macromolecules where it sheds some original light on the fundamental question "How is it that without water and hydrogen bonds life would not exist?".

This book will be of interest to researchers in the fields of physics, chemistry, biochemistry and molecular biology. It can also serve as a teaching aid for students attending course in chemical physics, chemistry or molecular biology. Engineers involved the water industry would benefit from reading this book, as would scientists working in pharmaceuticals, cosmetics and materials.

- * overview of what is known and being researched on the topic of hydrogen bonds and water molecules
- * reviews methods used to observe interactions between water molecules and hydrogen bonds
- * examines role of H-bond network developed by H₂O molecules



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