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Nota di contenuto	Part I. Bulk Water: 1. Uniqueness of water -- 2. Anomalies of water -- 3. Dynamics of water: molecular motions and hydrogen bond breaking kinetics -- 4. Inherent structures of liquid water -- 5. pH of water -- Part II. Water in Biology: Dynamical View and Function: 6. Biological water -- 7. Explicit role of water in biological functions -- 8. Hydration of proteins -- 9. Can we understand protein hydration layer: lessons from computer simulations -- 10. Water in and around DNA and RNA -- 11. Role of water in protein-DNA interaction -- 12. Water surrounding lipid bilayers -- 13. Water in Darwin's world -- Part III. Water in Complex Chemical Systems: 14. Hydrophilic effects -- 15. Hydrophobic effects -- 16. Aqueous binary mixtures: amphiphilic effect -- 17. Water in and around micelles, reverse micelles and microemulsions -- 18. Water in carbon nanotubes -- Part IV. Bulk Water: Advanced Topics: 19. Entropy of water -- 20. Freezing of water

into ice -- 21. Supercritical water -- 22. Microscopic approaches to understand water anomalies.

Sommario/riassunto

Building up from microscopic basics to observed complex functions, this insightful monograph explains and describes how the unique molecular properties of water give rise to its structural and dynamical behaviour which in turn translates into its role in biological and chemical processes. The discussion of the biological functions of water details not only the stabilising effect of water in proteins and DNA, but also the direct role that water molecules themselves play in biochemical processes, such as enzyme kinetics, protein synthesis and drug-DNA interaction. The overview of the behaviour of water in chemical systems discusses hydrophilic, hydrophobic and amphiphilic effects, as well as the interactions of water with micelles, reverse micelles, microemulsions and carbon nanotubes. Supported by extensive experimental and computer simulation data, highlighting many of the recent advances in the study of water in complex systems, this is an ideal resource for anyone studying water at the molecular level.
