Preface

Scanning probe microscopy techniques have significantly contributed to the rapid development of nanotechnology. Over several years representative developments were collected in the Springer Series ‘Applied Scanning Probe Methods I–XIII’ giving an overview on recent research and development activities in scanning probe methods as well as their application in various technology fields. Researchers from all over the world displayed their recent development in different fields including instrumentation and applications in material science, electronics/electro-optics, biology and medicine. The atomic force microscopy techniques such as static and dynamic AFM form a broad basis of these contributions due to their easy applicability in non-vacuum environments, e.g. air and liquids. This establishes an excellent basis for the study of bio-materials including biopolymers such as DNA, proteins, membranes and even complete cells in vitro. Static and Dynamic Force Microscopy helped to better understand the variety of molecular and physiological phenomena at the nanometer scale and opened a new window into a nano world for biological specimen. As a natural step representative contributions in this field previously published in the Springer series ‘Applied Scanning Probe Methods I–XIII’ were compiled in this book. Readers working in the field of nanobioscience will have a comprehensive overview of recent results obtained with scanning probes on biosystems and will also get many indications of their potential for future developments. The volume ‘Biosystems – Investigated by Scanning Probe Microscopy’ contains in total 27 selected articles organized in four topical parts, starting with part I on instrumentation and methods, followed by part II on applications of AFM on biomolecules and part III on AFM of biological membranes, cells and tissue, and completed by part IV on functional bio(-inspired) surfaces. The table-of-contents thus displays a hierarchical structure of the book ranging from instrumental and theoretical development to the application of AFM on biological systems with increasing complexity.

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