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Biomimetics
and Industrial
Applications

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Preface

The success of the Springer Series Applied Scanning Probe Methods I–VII and the rapidly expanding activities in scanning probe development and applications worldwide made it a natural step to collect further specific results in the fields of development of scanning probe microscopy techniques (Vol. VIII), characterization (Vol. IX), and biomimetics and industrial applications (Vol. X). These three volumes complement the previous set of volumes under the subject topics and give insight into the recent work of leading specialists in their respective fields. Following the tradition of the series, the chapters are arranged around techniques, characterization and biomimetics and industrial applications.

Volume VIII focuses on novel scanning probe techniques and the understanding of tip/sample interactions. Topics include near field imaging, advanced AFM, specialized scanning probe methods in life sciences including new self sensing cantilever systems, combinations of AFM sensors and scanning electron and ion microscopes, calibration methods, frequency modulation AFM for application in liquids, Kelvin probe force microscopy, scanning capacitance microscopy, and the measurement of electrical transport properties at the nanometer scale.

Vol. IX focuses on characterization of material surfaces including structural as well as local mechanical characterization, and molecular systems. The volume covers a broad spectrum of STM/AFM investigations including fullerene layers, force spectroscopy for probing material properties in general, biological films and cells, epithelial and endothelial layers, medical related systems such as amyloid aggregates, phospholipid monolayers, inorganic films on aluminium and copper oxides, tribological characterization, mechanical properties of polymer nanostructures, technical polymers, and nearfield optics.

Volume X focuses on biomimetics and industrial applications such as investigation of structure of gecko feet, semiconductors and their transport phenomena, charge distribution in memory technology, the investigation of surfaces treated by chemical-mechanical planarization, polymeric solar cells, nanoscale contacts, cell adhesion to substrates, nanopatterning, indentation application, new printing techniques, the application of scanning probes in biology, and automatic AFM for manufacturing.

As a result, Volumes VIII to X of Applied Scanning Probes microscopies cover a broad and impressive spectrum of recent SPM development and application in many fields of technology, biology and medicine, and introduce many technical concepts and improvements of existing scanning probe techniques.

We are very grateful to all our colleagues who took the efforts to prepare manuscripts and provided them in timely manner. Their activity will help both

students and established scientists in research and development fields to be informed about the latest achievements in scanning probe methods. We would like to cordially thank Dr. Marion Hertel, Senior Editor Chemistry and Mrs. Beate Siek of Springer for their continuous professional support and advice which made it possible to get this volume to the market on time.

Bharat Bhushan
Harald Fuchs
Masahiko Tomitori

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