Preface

The emergence and proliferation of proximal probes, in particular tip-based microscopies, have found applications in a large number of fields of scientific and industrial interest. These allow investigations down to the atomic scale. The recent focus on nanotechnology has made probe-based methods indispensible. The present editor coedited with Prof. H. Fuchs 13 volumes on applied scanning probe methods (SPM) from 2004 to 2009. These volumes have provided a timely comprehensive overview of SPM applications.

The success of the Springer Series Applied Scanning Probe Methods and the rapidly expanding activities in scanning probe development and applications in nanoscience and nanotechnology worldwide makes it a natural step to collect further specific results in the fields of development of scanning probe microscopy techniques, characterization, and industrial applications, particularly in nanoscience, nanotechnology, and biomimetics. In 2010, the editor launched a series of volumes on Scanning Probe Microscopy in Nanoscience and Nanotechnology. This second volume provides insight into the recent work of leading specialists in their respective fields. The focus in this volume is on the fundamental developments in SPM techniques.

This volume introduces many technical concepts and improvements of existing scanning probe techniques and covers a broad and impressive spectrum of recent SPM development and application in many fields of technology, biology, and medicine. The chapters are given under three major headings: *Scanning Probe Microscopy Techniques*, *Characterization*, and *Industrial Applications*. After introducing new developments in scanning probe microscopy, characterization data in various applications of scientific and technological interest is presented. Next, chapters on various industrial applications are presented. Characterization data and industrial applications include studies of biological materials, nanostructures, and nanotubes.

The chapters are written by leading researchers and application scientists from all over the world and from various industries to provide a broader perspective. The field is progressing so fast that there is a need for a set of volumes every 12–18 months to capture the latest developments.

We gratefully acknowledge the support of all authors representing leading scientists in academia and industry for the highly valuable contribution to this volume.

We also cordially thank the series editor Claus Ascheron and his staff member Adelheid Duhm from Springer for their continued support during the publication process.

We sincerely hope that readers find this volume to be scientifically stimulating and rewarding.

Columbus, OH, USA *Bharat Bhushan*
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