

From the Preface

The properties of matter at extreme length scales and the respective processes can differ markedly from the properties and processes at length scales directly accessible to human observation. This scale-dependent behaviour is possible in both directions; towards very large and very small scales. Scientists explore the frontiers of these extreme length scales in an effort to gain insight into yet unknown properties and processes.

While the exploration of larger scales has been established since the Renaissance era, a comprehensive investigation of small scales was impeded by the limitations of optical microscopy. These limitations were overcome in the 20th century. Since then, a continuous series of developments in analytical power has taken place. Today these developments allow studies of properties and processes even at the molecular or atomic scale (often referred to as nanoscience). These modern nanoscientific possibilities have triggered new innovative projects in geosciences, providing fascinating insights into small scales. Therefore, nanogeoscience has become a very important geoscientific subdiscipline.

It was the aim of the 9th EMU school: *Nanoscopic Approaches in Earth and Planetary Sciences* held from 12-17th August 2007 in Munich to bring together postgraduate students with geologists, geochemists, physicists and chemists, who are experts in both developing and applying a wide range of nano-scale techniques. The lectures covered important analytical techniques ranging from atomic force microscopy, nanoscale secondary ion-beam mass spectroscopy, transmission electron microscopy, electron energy-loss spectroscopy, to the most recent development in nano-scale resolution in synchrotron radiation. Thus, the school provided a thorough introduction to nanoscale techniques and to some of the most important results and developments in Earth and Planetary Sciences.

This volume of the EMU Notes in Mineralogy is a compilation of the contributions given by the lecturers at the 9th EMU school. The lecturers have provided eight chapters which give examples of the important research topics and which review the most recent developments in nanoscience within a geoscience context. The editors express their gratitude to the lecturers at the EMU school, to the authors in this volume and to Kevin Murphy for his editorial work.

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Contents of Volume 8

- Chapter 1: *Focused ion beam (FIB): site-specific sample preparation, nano-analysis, nano-characterization and nano-machining* by Richard Wirth
- Chapter 2: *Nanopetrology of pyroxenes: reconstruction of geodynamic parameters using TEM techniques* by Frank E. Brenker
- Chapter 3: *Electron energy-loss spectroscopy and energy-filtered transmission electron microscopy: Nanoscale determination of Fe³⁺/ΣFe ratios and valence-state mapping* by Ute Golla-Schindler and Peter A. van Aken
- Chapter 4: *Secondary Ion Mass Spectrometry – less conventional applications: TOF-SIMS, molecules and surfaces* by Ian Lyon and Torsten Henkel
- Chapter 5: *Ion microprobe analysis: Basic principles, state-of-the-art instruments and recent applications with emphasis on the geosciences* by Barbel W. Sinha and Peter Hoppe
- Chapter 6: *Synchrotron radiation micro- and nano-spectroscopy* by L. Vincze, G. Silversmit, B. Vekemans, R. Terzano, F. Brenker, M. Spagnuolo and L. Medici
- Chapter 7: *Reactivity of mineral surfaces at nano-scale: kinetics and mechanisms of growth and dissolution* by Carlos M. Pina and Guntram Jordan
- Chapter 8: *Nanoparticle-host interactions in natural systems* by Udo Becker, Martin Reich and Subhashis Biswas