

PREFACE

The process of biomineralization, the structure of biominerals, and the resulting properties inherently depend on a hierarchy of scales from the molecular to the microscale. Moreover, the very nature of biomineral formation, occurring as it does at the interface between organic and inorganic constituents, places the science of biomineralization at the intersection between physiochemical processes and biological functions. Consequently, unraveling the underlying mechanisms of formation and function demands a wide range of synthetic and analytical techniques that can probe materials and processes over the full range of scales while providing insight into the biology as well as the physics and chemistry of biominerals. In fact, as with most areas of science, much of the progress in the state of knowledge within this field is a result of advances in methodologies that include microscopy, spectroscopy, scattering, molecular biology, computational modeling, and polymer science. The purpose of this volume is to provide researchers in the field of biomineralization science a manual for applying these methods, well armed with the "tricks" one must inevitably master to overcome the technical obstacles associated with any new technique. The collection of techniques described within has been purposely chosen to enable researchers to investigate the scientific questions across the full range of challenges within the field, from biomineral formation to structure, as well as their relationship to function. Although both the methods and the state of knowledge will continue to evolve with time, it is our hope that by documenting the state of the art, that evolution will be accelerated.

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