Index

"This book describes novel and innovative concepts of the utilization of low-dimensional compounds as components of functional materials such as stimuli-responsive gels, quasi-solid electrolytes, and liquid crystals. It presents a lucid and fruitful view of low-dimensional compounds as potentially useful materials. I am delighted to see that this book contains the recent progress in fundamental and applicable aspects of low-dimensional compounds such as clay nanotubes, ladder-like polysilsesquioxanes, layered double hydroxides, and inorganic nanosheets."

Dr. Takeo Ebina
National Institute of Advanced Industrial Science and Technology, Japan

Low-dimensional compounds are molecules that correspond to various shapes, such as rod, ladder (one-dimensional compounds), and sheet (two-dimensional compounds). They are ordinarily found in electromagnetic fields. Recently, versatile low-dimensional compounds were proposed for use as components of various functional materials. These new-class low-dimensional compounds contribute significantly to industrial/materials sciences.

The molecular architecture consisting of low-dimensional compounds can also be found in nature. One example is the cell cytoskeleton, which is a network- or bundle-like architecture consisting of rod-like protein assemblies. The cell accomplishes its motility by structural transition of the cytoskeleton—that is, phase transition of the architecture of low-dimensional compounds in response to some stimuli induces shape changes in cells. Another example is nacre, which is composed of layered aragonite platelets, usually a metastable $CaCO_3$ polymorph. The layered inorganic platelets give nacre its stiffness and noncombustibility. Thus, the molecular architecture of low-dimensional compounds in natural life contributes to their functionality.

This book reviews various advanced studies on the application of low-dimensional compounds and is, therefore, important for the development of materials sciences and industrial technologies.

Kazuhiro Shikinaka received his doctorate from Hokkaido University in 2008. He was assistant professor at the Graduate School of Engineering, Tokyo University of Agriculture and Technology, Japan, from October 2008 March 2017. Currently, he is a senior researcher at the National Institute of Advanced Industrial Science and Technology, Japan. His research focuses on the functional materials consisting of rigid inorganic cylindrical clay minerals and the full utilization of plant biomass as basic chemical products. He is a recipient of the Award for Encouragement of Research in Clay Science (Clay Science Society of Japan, 2018), Chemical Innovation Encouragement Prize (Japan Association for Chemical Innovation, 2016), Award for Encouragement of Research in Polymer Science (Society of Polymer Science, Japan, 2014), Award for Encouragement of Research in Fiber Science (Society of Fiber Science and Technology Japan, 2014), The Clay Science Society of Japan Best Presentation Award (Oral session, 2014), and FAPS Young Scientist Poster Award (2009).

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