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The world is currently facing the urgent and demanding challenges of saving and utilizing energy as efficiently as possible. Materials science, where chemistry meets physics, has garnered a great deal of attention because of its versatile techniques for designing and producing new, desired materials enabling energy storage and conversion. This book is a comprehensive survey of the research on such materials. Unlike a monograph or a review book, it covers a wide variety of compounds, details diverse study methodologies, and spans different scientific fields. It contains cutting-edge research in chemistry and physics from the interdisciplinary team of Ehime University (Japan), the members of which are currently broadening the horizon of materials sciences through their own ideas, tailored equipment, and state-of-the-art techniques. Edited by Toshio Naito, a prominent materials scientist, this book will appeal to anyone interested in solid-state chemistry, organic and inorganic semiconductors, low-temperature physics, or the development of functional materials, including advanced undergraduate- and graduate-level students of solid-state properties and researchers in metal-complex science, materials science, chemistry, and physics, especially those with an interest in (semi)conducting and/or magnetic materials for energy storage and conversion.

Toshio Naito is full professor in the Department of Chemistry and Biology, Graduate School of Science and Engineering, Ehime University, Matsuyama, Japan, since April 2011. He obtained his bachelor's and master's degrees and his PhD in physical chemistry from the University of Tokyo, Japan, in 1988, 1990, and 1995, respectively. From April 1990 to March 1995, he worked as a lecturer in the Department of Chemistry, Faculty of Science, Toho University, Tokyo, Japan, and was involved in the development of new molecular metals and superconductors. From April to December 1995, he was assistant professor there, and his research involved the development of new molecular metals and superconductors. From January 1996 to November 2001, he was assistant professor in the Department of Chemistry, Graduate School of Science, Hokkaido University, Sapporo, Japan, working on the development of low-dimensional magnetic conductors. From December 2001 to March 2011, he worked there as associate professor, focusing on time-resolved spectroscopic studies on carrier dynamics of organic magnetic superconductors and the development of new methods of carrier doping for crystalline molecular conductors.

Prof. Dr. Naito has received 12 awards, including "The Chemical Society of Japan Award for Creative Work" for 2015 for developing a control method of conduction and magnetism in molecular crystals. He has published 190 research papers and 14 books and has 5 patents to his name. His current research focuses on the development of photoresponsive molecular materials with magnetism, conduction, and other functionalities.

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