

Preface

Intelligent materials, which respond to external signals by a distinct reaction to the outside world, are the basis of promising new technologies, extending from artificial muscles, nanoscale motors to new drug-delivery devices. It may take scientists centuries to reach the complexity and efficiency of biological systems; on the other hand synthetic devices encompass a broader scope than natural functions, which are limited, *e.g.*, by the lack of protein stability and the restriction of metabolic pathways. At the same time one can hope to better understand with the help of biomimetic approaches the fundamental mechanisms of biological systems. As stated by Richard P. Feynman in 1959 in a famous address, there is plenty of room at the bottom for miniaturization. Miniaturization of technical devices, possibly down to molecular scale, is an important strategy for material and energy-saving technologies, and thus can be a significant contribution towards a sustainable development. The broad field of very different materials and external stimuli, which reach from electrical and magnetic input through effects of temperature and light to selective molecular recognition of effector compounds, and their application for new devices call for joint efforts of many chemists, physicists and engineers. Fortunately, we were able convince leading experts of the different fields to contribute their views and results to the present monograph. Our sincere thanks go to them – they deserve the merit of the book, while the editors must bear responsibility for any shortcomings. As is often the case not all of the planned chapters did materialize, and several topics that are already covered in established monographs had to be omitted in view in order to keep the book within an affordable scope. Last but not least, we also thank the Nobel Prize winner Professor Pierre-Gilles de Gennes for his support and encouragement towards publishing this book and for his enlightening, thorough and thoughtful foreword for this book.

Mohsen Shahinpoor, Hans-Jörg Schneider
Albuquerque/Saarbrücken

