Foreword

I am honored to be invited to write the foreword for the book *Synthesis and Biomedical Applications of Magnetic Nanomaterials*. The three authors of this book are outstanding young scientists I am familiar with, who have accomplished a lot in their fields. Dr. Yanglong Hou has focused on the fabrication, modulation and applications of magnetic nanomaterials, Dr. Jing Yu has been using magnetic nanomaterials in diagnosis and therapy of cancer, while Dr. Song Gao is an expert in nano or molecular magnet. This book is valuable because it brings together the works of young scientists currently engaged in related research in the mainland of China.

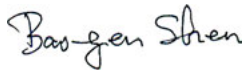
Magnetism is a unique property that is ubiquitous worldwide. Inspired by the phenomenon that some birds and insects can be navigated by using the Earth's magnetic field, people begin to be interested in exploring the biological effects of magnetism. With the development of molecular biology, the relationship between magnetism and biosome, however, is tended to be studied in a cell or even molecular scale. Magnetic field applied in our daily life is relatively too big compared with organelle and atoms.

Nanometer is a measure of length with the definition of 10^{-9}meter. It is in a similar scale to protein, nucleate and other biomolecules. As a result, magnetic materials in nanometer, which is termed as magnetic nanomaterials, are more likely to interact with biological molecules, and even can be applied for biological manipulation. In addition, these magnetic nanomaterials possess a biological favorable magnetic property, *i.e.*, superparamagnetism, which reduced the aggregation during body circulation for much safer biological applications. Another feature of magnetic nanomaterials is their specific magnetization, and it brightened the improvement in magnetic-thermal conversion and enhanced the proton relaxation in ambient water molecule under magnetic field. These two advancements are beneficial to the adhibition of magnetic nanomaterials for magnetic-mediated hyperthermia and magnetic resonance imaging (MRI) in biomedicine.

Since magnetism of magnetic nanomaterials is closely dependent on their phases, morphologies and sizes, controlled synthesis of these materials has been studied in depth. As the surface status of magnetic nanomaterials affected not only their magnetism, but also the body circulation and distribution, surface modification in

magnetic nanomaterials has attracted much attention as well.

In comparison to the researches in physics or chemistry, nano science and life science, particularly the interdisciplinary application by using magnetic nanomaterials in biomedicine is at its infancy. At the same time, I believe that the field of synthesis and biomedical applications of magnetic nanomaterials should afford many opportunities and challenges. As such, I hope that the publication of this book, ranging from synthesis and modification of magnetic nanomaterials to their biological applications in diagnosis and therapy, as well as the biocompatibility, will attract more young scientists to be engaged into this interdisciplinary field, which motivates me for this foreword.



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