

Preface

Due to their unique physical and chemical properties, silver nanoparticles (AgNPs) are extensively used in antibacterial and medical products, electronics, catalysts, and biosensors. The increasing production and use of AgNPs in industrial and commercial products would increase their release into the environment, which aroused the growing public and regulatory concerns to the potential risks they may pose to humans and the environmental organisms in recent years. To evaluate the environmental and biological safety, data on the occurrence, transport, transformation, distribution, fate, effects, and toxicity of AgNPs in the environments are needed. Owing to the distinguished chemical properties of Ag, AgNPs are highly dynamic in physical and chemical species in the environment, giving rise to characteristics that are different from other nanoparticles, such as dissolution and re-reduction, sulfidation, and chlorination. Although great achievements have been made during the past years, large knowledge gaps exist in the areas of characterization and determination, environmental processes and effects, and biological toxicity of AgNPs. It is for the purpose of promoting in-depth study on the environmental issues of AgNPs, we edit the book *Silver Nanoparticles in the Environment*.

This book is designed to bring the state of the art of knowledge on environmental aspects of AgNPs. We believe it will be a valuable resource to students and researchers in environmental science and technology, chemistry, toxicology and health sciences, to scientists in material science and nanotechnology for designing environmentally benign AgNPs, as well as to producers and consumers involved in the production and consumption of AgNPs in various areas including catalysis, consumer products, food technology, textiles/fabrics, and medical products and devices.

As a comprehensive book, the chapters in this book cover the main environmental issues of AgNPs. The first chapter describes briefly the history, properties, applications, and environmental concerns of AgNPs. Then, the methods for separation, characterization, and determination of AgNPs in environmental and biological matrices were addressed in Chap. 2. The following three chapters focus on the environmental processes and effects of AgNPs, with emphasis on the pathway to environment, transformation and fate, as well as toxicological effects and mechanisms. In the last chapter, the environmental bioeffects and safety assessment of AgNPs in environment are discussed.

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