Preface

Nanotechnology holds a great potential in advancing water and wastewater treatment general performance boosting water supply through the safe use of unconventional water sources such as treated wastewater. Similarly, nanoremediation could drastically improve subsurface in situ remediation efficiency increasing the contaminant degradation and detoxification and minimizing off-site or ex situ activities.

The aims of developing nano-based techniques and later on technologies to remediate polluted waters, groundwater and soil/sediment are in growing harmony with the principles of Green Chemistry, and more broadly, Green Engineering and Technology. In the book framework, worldwide investigators present and discuss the continuing efforts to better understand the recent development in applying nanoscience, nano-engineering and nanotechnology for environmental remediation.

Candidate nanomaterials, properties and mechanisms that enable the applications, advantages and limitations as compared to existing processes, and barriers and research needs for commercialization are presented in the Chapters "Progress in Nanomaterials Applications for Water Purification"–"The Use of Al and Fe Nanoparticles for the Treatment of Micropollutants". Chapter "Environmental Nanoremediation and Electron Microscopies" will compile aspects related to electron microscopy applied to nanomaterials detection. The application of nanomaterials in photocatalysis processes and as adsorbents is discussed in Chapters "Adsorption and Desorption Properties of Carbon Nanomaterials, the Potential for Water Treatments and Associated Risks"–"Removal of Copper, Iron and Zinc from Soil Washing Effluents Containing Ethylenediaminedisuccinic Acid as Chelating Agent Through Sunlight Driven Nano-TiO_2-Based Photocatalytic Processes", whereas the effect of nanoparticles in the wastewater treatment and activated sludge is discussed in Chapters "Impact of Silver Nanoparticles on Wastewater Treatment" and "Use of Nanoparticles for Reduction of Odorant Production and Improvements in Dewaterability of Biosolids". Chapter "Environmental Effects of nZVI for Land and Groundwater Remediation" will present the environmental effects of nZVI for land remediation. Finally, the risk associated with the presence of nanoparticles in the environment will be evaluated in Chapter "Presence, Behavior and Fate of Engineered Nanomaterials in Municipal Solid Waste Landfills".

All chapters include fundamentals of the processes investigated that will offer students, technicians and academicians the opportunity to evaluate and select the technologies that lead to be aware of the risk and benefit related to the application of nanotechnologies for environmental remediation.

Fisciano, Italy — Giusy Lofrano
Naples, Italy — Giovanni Libralato
Bronx, USA — Jeanette Brown
December 2016

http://www.springer.com/978-3-319-53161-8

Nanotechnologies for Environmental Remediation
Applications and Implications
Lofrano, G.; Libralato, G.; Brown, J. (Eds.)
2017, X, 325 p. 75 illus., 58 illus. in color., Hardcover
ISBN: 978-3-319-53161-8