

The Handbook of Environmental Chemistry

Founded by Otto Hutzinger

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Volume 32

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The Handbook of Environmental Chemistry

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Vol. 32, 2015

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Vol. 16, 2011

Effect-Directed Analysis of Complex Environmental Contamination

Volume Editor: W. Brack
Vol. 15, 2011

Environment, Energy and Climate Change I

Environmental Chemistry of Pollutants and Wastes

Volume Editors: Elena Jiménez · Beatriz Cabañas ·
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The Handbook of Environmental Chemistry

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Aims and Scope

Since 1980, *The Handbook of Environmental Chemistry* has provided sound and solid knowledge about environmental topics from a chemical perspective. Presenting a wide spectrum of viewpoints and approaches, the series now covers topics such as local and global changes of natural environment and climate; anthropogenic impact on the environment; water, air and soil pollution; remediation and waste characterization; environmental contaminants; biogeochemistry; geoecology; chemical reactions and processes; chemical and biological transformations as well as physical transport of chemicals in the environment; or environmental modeling. A particular focus of the series lies on methodological advances in environmental analytical chemistry.

Series Preface

With remarkable vision, Prof. Otto Hutzinger initiated *The Handbook of Environmental Chemistry* in 1980 and became the founding Editor-in-Chief. At that time, environmental chemistry was an emerging field, aiming at a complete description of the Earth's environment, encompassing the physical, chemical, biological, and geological transformations of chemical substances occurring on a local as well as a global scale. Environmental chemistry was intended to provide an account of the impact of man's activities on the natural environment by describing observed changes.

While a considerable amount of knowledge has been accumulated over the last three decades, as reflected in the more than 70 volumes of *The Handbook of Environmental Chemistry*, there are still many scientific and policy challenges ahead due to the complexity and interdisciplinary nature of the field. The series will therefore continue to provide compilations of current knowledge. Contributions are written by leading experts with practical experience in their fields. *The Handbook of Environmental Chemistry* grows with the increases in our scientific understanding, and provides a valuable source not only for scientists but also for environmental managers and decision-makers. Today, the series covers a broad range of environmental topics from a chemical perspective, including methodological advances in environmental analytical chemistry.

In recent years, there has been a growing tendency to include subject matter of societal relevance in the broad view of environmental chemistry. Topics include life cycle analysis, environmental management, sustainable development, and socio-economic, legal and even political problems, among others. While these topics are of great importance for the development and acceptance of *The Handbook of Environmental Chemistry*, the publisher and Editors-in-Chief have decided to keep the handbook essentially a source of information on "hard sciences" with a particular emphasis on chemistry, but also covering biology, geology, hydrology and engineering as applied to environmental sciences.

The volumes of the series are written at an advanced level, addressing the needs of both researchers and graduate students, as well as of people outside the field of "pure" chemistry, including those in industry, business, government, research

establishments, and public interest groups. It would be very satisfying to see these volumes used as a basis for graduate courses in environmental chemistry. With its high standards of scientific quality and clarity, *The Handbook of Environmental Chemistry* provides a solid basis from which scientists can share their knowledge on the different aspects of environmental problems, presenting a wide spectrum of viewpoints and approaches.

The Handbook of Environmental Chemistry is available both in print and online via www.springerlink.com/content/110354/. Articles are published online as soon as they have been approved for publication. Authors, Volume Editors and Editors-in-Chief are rewarded by the broad acceptance of *The Handbook of Environmental Chemistry* by the scientific community, from whom suggestions for new topics to the Editors-in-Chief are always very welcome.

Damià Barceló
Andrey G. Kostianoy
Editors-in-Chief

Preface

This work, which is divided into two volumes, *Environment, Energy and Climate Change I* and *Environment, Energy and Climate Change II*, is a consequence of the *Energy and Environment Knowledge Week (E2KW)* congress that was held in Toledo (Spain) from 20th to 22nd of November 2013 (<http://www.congress.e2kw.es>). This congress represented an exceptional opportunity for presenting cutting-edge research in the field environmental, energy and climate change and illustrating the wide experience on several interesting topics of the contributing authors. The two volumes aim to address some of the key issues facing the environmental problems through interdisciplinary approaches.

Volume 1 is dedicated to the *Environmental Chemistry of Pollutants and Wastes* and collects a selection of 15 chapters that review several aspects of the environmental chemistry of air, soil and water contaminants as well as treatments of organic wastes. The first two chapters (by G. Da et al. and by P. Chelin et al.) provide an overview on the atmospheric monitoring of indoor (particles) and outdoor (O₃ and CO) pollutants. A revision of the daytime and night-time atmospheric chemistry of oxygenated pollutants is presented in two following chapters by E. Jiménez and I. Barnes and by B. Cabañas et al., respectively. Soil pollution by heavy metals in mining areas is the subject matter of the chapters by P. Higuera et al., by R.C. Rodríguez et al. and by J. Lillo et al., while the chapter by S. del Reino et al. presents a chemical oxidation treatment of hydrocarbon polluted soils. In the subsequent chapters, sustainable and emerging technologies on chemical treatments of organic wastes (chapters by D. Simón et al., by C. Gutiérrez et al., and by F.J. Fernández et al.), wastewaters (chapter by E. Valero et al.) and animal wastes (chapter by J.M. Martín-Marroquín and D. Hidalgo Barrio) are described. Capture and storage of CO₂ is one of the most promising technologies for reducing the levels of this greenhouse gas. The chapter by J. Rincón et al. is devoted to mitigation of the greenhouse effect by using photocatalytic conversion methods. The use of non-conventional

methods in green chemistry synthesis is also highlighted in the last chapter (by A. de la Hoz et al.).

We sincerely thank all authors for their involvement and efforts in preparing their chapters.

Ciudad Real, Spain
Paris, France

Elena Jiménez and Beatriz Cabañas
Gilles Lefebvre

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