

Handbook of Research on Water Sciences and Society

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Water supports three basic pillars of our life and survival: safety, security, and sustainability. Hence, it is extremely important to revisit the fundamental characteristics of water in order to discover additional information and the characteristics water has that will help uncover pathways to support the United Nations Sustainable Development Goals (UN SDG) to reduce inequality and make cities and human settlements more inclusive, safe, resilient, and sustainable. Clean water is a critical component to meet such goals. While the fundamental physical and chemical properties of water continue to reveal new aspects, it is critical that we review these properties in the context of several recent applications and by case studies.

The **Handbook of Research on Water Sciences and Society** provides the basics of water science, ways to sense/detect and mitigate contaminants, several regional case studies, and societal aspects of water, including the human right to access water. The book serves as a comprehensive knowledge base on the latest fundamental and applied research and scientific innovations regarding the relationships between society and water resources, safe and sustainable use of water, watershed stewardship, industrial application, and public health awareness. Covering a wide range of topics, it is an ideal resource for researchers, professionals, policymakers, scientists, practitioners, instructors, and students.

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We live in a fancy world of global digitization, decarbonization, artificial intelligence, smart and connected cities using 5/6G, biomimicking, and 3/4D printing living organs, yet the two looming challenges to human existence are...

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Maria Vasile Gonta (Moldova State University, Moldova), Veronica Porubin-Schimbator (Moldova State University, Moldova), Larisa Mocanu (Moldova State University, Moldova)

In this chapter, a comparative degradation/mineralization study of two surfactants—the anionic surfactant 2-ethyl-hexyl Sodium Sulfate (2-EHS) and the cationic surfactant Cetyltrimethyl Ammonium Bromide (CTAB)— was performed using a...

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Oleg Bogdevich (Academy of Sciences of Moldova, Moldova), Gheorghe Duca (Institute of Chemistry, Moldova State University, Moldova & Academy of Science of Moldova, Moldova & Romanian Academy, Romania), Manuela Elisabeta Sidoroff (National Institute R&D for Biological Sciences, Romania), Adrian Stanica (National Institute for Research and Development of Marine Geology and Geoecology (GeoEcoMar), Romania), Aurel Persoiu (Emil Racovita Institute of Speleology, Romania), Ashok Vaseashta (International Clean Water Institute, USA & Transylvania University of Brasov, Romania & Academy of Sciences of Moldova, Moldova)

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Eylül Damla Gönül Sezer (Yeditepe University, Turkey), Duygun Fatih Demirel (İstanbul Kültür University, Turkey)

The Marmara Sea, which is of great importance for Turkey, has been facing a serious mucilage problem since the last quarter of 2020 due to various natural and human-induced factors. In addition to the negative effects of the observed...

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Roxana Elena Ionete (National Research and Development Institute for Cryogenics and Isotopic Technologies, Romania), Diana Costinel (National Research and Development Institute for Cryogenics and Isotopic Technologies, Romania), Oana Romina Botoran (National Research and Development Institute for Cryogenics and Isotopic Technologies, Romania)

Tracing contaminant in surface and groundwater remains an issue of significance. Nitrate is one of the parameters to be monitored identifying the source and biogeochemical transformations of the nitrogen of interest for the...



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Alessandra Criscuoli (Institute on Membrane Technology (CNR-ITM), Italy)

Membrane distillation (MD) is a thermally-based membrane operation in which the distillation of aqueous feeds occurs through a membrane. Although first works on MD appeared in the literature in the 1960s, the application of MD has...



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Nitai Charan Giri (Central Institute of Petrochemical Engineering and Technology, India), Sushanta Kumar Samal (Central Institute of Petrochemical Engineering and Technology, India), Bhanja Prasad Patro (Central Institute of Petrochemical Engineering and Technology, India)

Polymers play an important role in water purification due to advantages such as the enhanced capacity of the treatment plant, the lowering of sludge production compared to inorganic coagulants, etc. The formation of clay/polymer...



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Janusz Lipkowski (Cardinal Stefan Wyszyński University, Poland), Andrey Yu Manakov (Institute of Inorganic Chemistry Siberian Branch of the Russian Academy of Sciences, Russia)

Water is a mysterious substance; being hydrophilic (by definition), it can capture hydrophobic or hydrophobic-hydrophilic species forming different kinds of hydrate inclusion compounds. Hydrate inclusion compounds can be formed by a...



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Igor Povar (Institute of Chemistry, Moldova), Oxana Spinu (Institute of Chemistry, Moldova), Alfonso Mucci (Department of Earth and Planetary Sciences, McGill University, Canada)

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Elena Bunduchi (State University of Moldova, Moldova), Gheorghe Duca (Academy of Sciences of Moldova, Moldova), Viorica Gladchi (State University of Moldova, Moldova)

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Clement Kiptum (University of Eldoret, Kenya)

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Maria Vasile Gonta (Moldova State University, Moldova), Larisa Mocanu (Moldova State University, Moldova), Veronica Porubin-Schimbator (Moldova State University, Moldova)

This chapter presents the study of kinetics and mechanisms of transformation of EC (antibiotics) by advanced oxidation processes (AOPs): Fenton (H₂O₂/Fe(II)), UV photolysis (UV/H₂O₂/TiO₂), and combined methods. The application of...

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Neeraj Kumari (K. R. Mangalam University, Gurugram, India), Meena Bhandari (K. R. Mangalam University, Gurugram, India)

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Water is one of the most important issues of our time intertwined with global warming and population expansion. The management of water supplies and the conservation of water resources remains one of the most challenging yet exciting...



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Dhanya Gopalakrishnan Nair (University of Kerala, India), Vinod Gopal Venugopal (University of Kerala, India), Jaya Divakaran Sarasamma (University of Kerala, India)

Untreated sewage is the main reason for soil and water pollution. Constructed wetland technology is an emerging and acceptable wastewater treatment method as it can effectively remove almost all types of pollutants without harming...



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Immanuel Suresh Jayasingh (The American College, India), Iswareya Lakshimi V (The American College, India)

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Jessen George (Reverend Jacob Memorial Christian College, India), Suriyanarayanan Sarvajayakesavalu (Vinayaka Missions Research Foundation (Deemed), India), Dev Raj Joshi (Tribhuvan University, Nepal), Vijayraja Dhanraj (Reverend Jacob Memorial Christian College, India), Hima Haridasan (PPD Pharmaceutical Development India Pvt. Ltd., India), Aswathi K. Raghav (IADFAC Laboratories, India), Fatemeh Mohammadzadeh (Lund University, Sweden)

The public health of developing and undeveloped countries is in crisis due to an increased incidence of acute gastroenteritis via contaminated drinking water. Acute gastroenteritis is the third leading cause of mortality in the...



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Tatyana Leonidovna Rakitskaya (I. I. Mechnikov Odessa National University, Ukraine), Tatyana A. Kiose (I. I. Mechnikov Odessa National University, Ukraine), Alla S. Truba (I. I. Mechnikov Odessa National University, Ukraine), Alim Abdul-Amidovich Ennan (Physico-Chemical Institute for Environment and Human Protection of MES of Ukraine, Ukraine & National Academy of Sciences of Ukraine, Ukraine)

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Viorica Gladchi (State University of Moldova, Moldova), Elena Bunduchi (Moldova State University, Moldova), Vladislav Blonschi (Moldova State University, Moldova), Lidia Romanciuc (Academy of Sciences of Moldova, Moldova)

Surface water is one of the most significant sources of natural ecosystems existence, climate regulation, broadly used for economic activity, drinking water supply, recreation, irrigation, etc. Therefore, chemical composition and...



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Kaltoum Belhassan (Independent Researcher, UK), Hafizullah Rasouli (Kabul University, Afghanistan), Ashok Vaseashta (International Clean Water Institute, USA & Transylvania University of Brasov, Romania & Academy of Sciences of Moldova, Moldova)

North Africa is limited in the north by the Mediterranean Sea, in the east by the Red Sea, in the west by the Atlantic Ocean, and in the south by the Sahara Desert. North Africa includes five countries: Egypt, Algeria, Morocco...



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Inna Romanciuc (State Institution Scientific Centre for Aerospace Research of the Earth Institute of Geological Science of the National Academy of Sciences of Ukraine, Ukraine), Lesia Yelistratova (State Institution Scientific Centre for Aerospace Research of the Earth Institute of Geological Science of the National Academy of Sciences of Ukraine, Ukraine), Alexandr Apostolov (State Institution Scientific Centre for Aerospace Research of the Earth Institute of Geological Science of the National Academy of Sciences of Ukraine, Ukraine), Victor Chekhnii (Institute of Geography of the National Academy of Sciences of Ukraine, Ukraine)

Wetlands, marshes, and swamps have great natural importance. They have a number of important environmental functions, supporting the water balance of the area and ensuring its high biodiversity. This is reflected in the wide range of...



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Magh Mela, held from 14th Jan. to 11th Mar. 2021, is an important yearly ritual held on the bank of river Ganga in Prayagraj, Uttar Pradesh. River Ganga is the longest and most sacred river of India. It originates in the Western...



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Ketevan Kupatadze (Ilia State University, Georgia)

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Water quality assessment is a necessity for groundwater resource management, especially in arid regions. Nevertheless, many difficulties appear in choosing the most appropriate models for the evaluation of water suitability. The...



Water, Society, and Transdisciplinarity



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Ketevan Kupatadze (Ilia State University, Georgia), Davit Malazonia (Ilia State University, Georgia)

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Nima Norouzi (Islamic Azad University, Dubai, UAE)

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Access to potable water and sanitation promotion is critical to public health and community development. The rural communities of Garatu and Gidanmangoro were selected for a comparative investigation of the challenges households...



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Gary Ng (viAct, Hong Kong), Hugo Cheuk (viAct, Hong Kong), Surendra Singh (viAct, Hong Kong), Baby Sharma (viAct, Hong Kong)

Construction is an activity that fulfills one of the basic needs of humans (i.e., shelter). However, this industry is also known for its excessive waste generation, which impacts the environment if not disposed of appropriately. Much...



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Baby Sharma (Amity University, Jaipur, India), Shruti Mathur (Amity University, Jaipur, India), Nilima Kumari (Banasthali Vidyapith, India), Vinay Sharma (Amity University, Jaipur, India)

With an increasing inclination of the world towards fashion and clothing, textile industries are becoming one of the major contributors. This has led to a simultaneous upsurge of various recalcitrant synthetic dyes. The effluents...



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Rajendra Kumar (Independent Researcher, India), Shruti Mathur (Amity Institute of Biotechnology, Amity Center for Water Studies and Research, Amity University, Noida, India)

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Ranjit Barua (OmDayal Group of Institutions, India), Nibedita Bardhan (Calcutta University, India), Debasish Banerjee (OmDayal Group of Institutions, India)

Research shows that the polar ice caps are rapidly melting at places. Presently, the melting ice caps are having a huge impact on the Earth's ecosystem, which leads to unpredictable disasters. Regional warming and melting ice...



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Vladan Kuzmanović (University of Belgrade, Belgrade, Serbia)

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