Desalination and Water Treatment
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Book Review

Desalination, Trends and Technologies, Edited by Michael Schorr, Publisher: InTech, February 2011, Hardcover, 334 pp., ISBN 978-953-307-311-8, E100.

The environment quality, worldwide water scarcity and clean energy have been established today as central disciplines in modern science, engineering and technology. They are already being linked to the crucial, actual problems of climate change, global warming and greenhouse-gas emissions, all interrelated phenomena. Innovative desalination technology of saline water (SW) contributes to alleviate these problems by producing abundant fresh water from SW, mainly seawater and brackish water.

This book states that the desalination plants (DPs) have a high level of corrosion risk since they handle and process aggressive SW under severe operating conditions which include filtration, heat exchange, distillation, evaporation, agitation and circulation and high flow velocities, often turbulent. These SW: sea, brackish and brines cause localized corrosion such as pitting, crevice, galvanic and stress corrosion. In addition, biological fouling and mineral scaling are frequent nuisances that alter the equipment surface performance and induce corrosion.

Today about 15,000 DPs operate worldwide with an estimated total production capacity of 32 million m^3 d^{-1}, in the Mediterranean Sea coast countries, the Middle East, South America deserts, the Canary and Caribbean islands; all places with limited water supplies. In the USA there are 1500 desalination facilities constituting a 30 billion USD business.

The desalination industry is in the middle of an expansion and modernization program designed to construct more efficient and larger DP's that will reduce production costs. The maintenance of its infrastructure assets requires a robust understanding of the integration between global climate change and the materials engineering-structure-climate-interaction, induced by variations in humidity, temperature, solar radiation, drought and pluvial precipitation mainly during extreme events. Recently the *Institute of Materials, Minerals and Mining (IOM3)*, London has published a special issue of its journal: *Corrosion Engineering, Science and Technology, Vol. 45 (1), 2010*, which brings together papers examining climate change induced corrosion.

The economic and social relevance of the desalination industry, as shown in this volume, is evident by the activities of the diverse international and national professional associations, R&D institutions and industrial enterprises involved in all the aspects of desalination science, engineering and technology. It includes authorities from government, industry, and academia that address progress of vital importance for the national and global prosperity. Lately, the threat of bioterrorism, have pushed desalination to the forefront of efforts to preserve the available supply of water.

The book comprises 14 chapters arranged in three sections: desalination processes and plants, novels trends and technologies and environmental and economical aspects, covering all the issues related to water desalination. These chapters emphasize the relationship between problems encountered with the use of feed water, the processes developed to address them, the operation of the required plants and solutions actually implemented.

A special chapter entitled: Corrosion Control in the Desalination Industry, is devoted to the synergetic effect of corrosion, scaling and fouling on the engineering materials used and the diversified equipment operated in DPs. The metallic and non metallic materials listed display a reasonable endurance to the fluids (liquid, vapor and gases) handfed and processed in the plant installations and environment. Corrosion scaling and fouling phenomena appear simultaneously in DPs, they interact and influence each other. Corrosion protection, monitoring and control is explained and technical procedures for selection of corrosion-resistant are presented. A large list of useful references is attached.

Leading experts from academia and industry, as well as environment researchers, distinguished teachers and experienced engineers have written special chapters for this impressive collection. The contributing authors offer a large amount of practical information, presenting it in a highly condensed yet coherent body of useful knowledge and practical expertise. Moreover, the multi-authored characteristic of this volume offers a wide spectrum of knowledge and experience, as the authors are specialists in different fields and express diverse approaches and orientations. The intended multi-facet content of this publication certainly contributes to enrich it.

This compendium provides valuable, encyclopedic knowledge on research, development, processes, plants and technologies of this industry, from the fundamental concepts up to many practical cases collected from around the world. Hence, it provides a useful insight into the world of water, energy and desalination, easy to follow and to apply.

This volume is an essential companion to chemists, as well as to civil and chemical engineers who design, build and operate DPs. It is also highly relevant to maintenance personnel, corrosion specialists, material- and mechanical engineers. Also, university lectures and researchers will find it useful for their students while preparing their thesis on subjects related to desalination processes and plants. Not less so, desalination industry executives should make sure that their field managers and engineers in charge of running their plants will have access to it, and apply the built-in knowhow in their daily work routine. All in all, this volume enables the reader to gain a deeper understanding of the state of the art of the desalination industry and to become acquainted with its most recent developments and technologies.

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