# REVIEWS IN CHEMICAL ENGINEERING

### **EDITORS-IN-CHIEF**

Dan Luss, Houston, TX Neima Brauner, Tel Aviv

## **EDITORIAL BOARD**

David Agar, Dortmund Mark E. Davis, Pasadena, CA Lidietta Giorno, Rende J.B. Joshi, Mumbai Johannes Khinast, Graz Joseph Kost, Beer Sheva Jinghai Li, Beijing L. Gary Leal, Santa Barbara, CA Patrick L. Mills, Kingsville, TX Massimo Morbidelli, Zurich Ka Ming Ng, Hong Kong Michael Nikolaou, Houston, TX Avi Schroeder, Haifa John H. Seinfeld, Pasadena, CA E. Hugh Stitt, Cleveland Enrico Tronconi, Milan Constantinos G. Vayenas, Patras Peter Vekilov, Houston, TX Andrey N. Zagoruiko, Novosibirsk Edwin Zondervan, Bremen

# **DE GRUYTER**

Please see the journal's homepage for Abstracting & Indexing Services information.

The publisher, together with the authors and editors, has taken great pains to ensure that all information presented in this work (programs, applications, amounts, dosages, etc.) reflects the standard of knowledge at the time of publication. Despite careful manuscript preparation and proof correction, errors can nevertheless occur. Authors, editors and publisher disclaim all responsibility for any errors or omissions or liability for the results obtained from use of the information, or parts thereof, contained in this work.

The citation of registered names, trade names, trademarks, etc. in this work does not imply, even in the absence of a specific statement, that such names are exempt from laws and regulations protecting trademarks etc. and therefore free for general use.

ISSN 0167-8299 · e-ISSN 2191-0235

All information regarding notes for contributors, subscriptions, Open access, back volumes and orders is available online at www.degruyterbrill.com/revce

### RESPONSIBLE EDITOR(S)

Prof. Dan Luss, University of Houston, Department of Chemical and Biomolecular Engineering, S222 Engineering Building 1, 4800 Calhoun Ave., Houston, TX 77204-4004, USA, Tel.: +1 (713)743-4305, Email: dluss@uh.edu

Prof. Neima Brauner, Tel-Aviv University, Department of Fluid Mechanics and Heat Transfer, Faculty of Engineering, Ramat-Aviv, Tel-Aviv 69978, Israel, Tel.: +972-3-6408127, Email: brauner@tauex.tau.ac.il

PUBLISHER Walter de Gruyter GmbH, Berlin/Boston, Genthiner Straße 13, 10785 Berlin, Germany.

**JOURNAL COORDINATOR** Dr. Gunda Stöber, De Gruyter, Genthiner Straße 13, 10785 Berlin, Germany, Tel.: +49 (0)30 260 05-279, Email: rev.chem.eng.editorial@degruyterbrill.com

© 2025 Walter de Gruyter GmbH, Berlin/Boston

TYPESETTING TNQ Tech Private Limited, Chennai, India

PRINTING Franz X. Stückle Druck und Verlag e.K., Ettenheim

Questions about General Product Safety Regulation: productsafety@degruyterbrill.com



# **Contents**

# **Reviews**

Zahra Gholami, Fatemeh Gholami, Josef Šimek and Mohammadtaghi Vakili

Advancing hydrogen infrastructure: a review of storage and transportation solutions for a sustainable future —— 711

Dennis Delali Kwesi Wayo, Leonardo Goliatt and Masoud Darvish Ganji

DFT and hybrid classical–quantum machine learning integration for photocatalyst discovery and hydrogen production —— 741

Nooshin Taghili, Rouein Halladj and Sima Askari

Advancements in synthesis methods and their effects on the physico-chemical properties and yield efficiency of ZSM-5/SAPO-34 composites: a comprehensive review —— 775