This special issue in *PAC* includes contributions presented at POLY-CHAR 2023 collectively showcasing the recent advance in polymer research from synthesis to applications.

Furthermore, the present special issue is complemented with selected papers that honor late Prof. Dr. Melissa Chan Chin Han (Faculty of Applied Sciences of University Teknologi MARA, Malaysia) and her invaluable contributions to polymer science and the wider community through her very active role in IUPAC and in POLY-CHAR. During the opening ceremony obituary to Prof. Dr. Melissa Chan Chin Han was observed. Her dedication and tireless efforts to develop POLY-CHAR as an inclusive organization spanning all continents with a focus on providing opportunities especially for young scientists and to actively support their education is unsurpassed. With a balanced mix of tutorial contributions on central aspects of polymers and polymeric materials as well as highlights of recent developments, we bow to honor Melissa Chan Chin Han and dedicate this issue to the memory and legacy of our dear colleague, companion and friend.

From water to chemicals: vision and opportunities of a sustainable hydrogen society

A special issue of *PAC* dedicated to the 5th edition of *Avogadro Colloquia* "From water to chemicals: vision and opportunities of a sustainable hydrogen society" was released as Volume 96, Issue 4, April 2024.

Preface by Lidia Armelao, Elio Giamello, Gaetano Guerra, and Maria Chiara Carrozza; https://doi.org/10.1515/pac-2024-0229.

The Avogadro Colloquia conference represents a forum of discussion on challenging and urgent topics relating to chemical sciences, the environment, and the needs of society. It is jointly organized periodically by the National Research Council (CNR), Department of Chemical Sciences and Materials Technologies and the Italian Chemical Society. The 5th edition was one of the first important events for the celebrations of CNR centenary and was held at the CNR headquarters in Rome on 15-16 December 2022. This edition of the Colloquia was focused on the technologies for hydrogen production and use in the so-called "green transition" towards a society with reduced CO_2 emissions. Such technologies fit well the objectives suggested by the United Nations and by Mission EU2030 for the mitigation of the climate change.

Greeting addresses were given by the IUPAC president Javier García Martínez, the elected president of the European Chemical Society (EuChemS) Angela Agostiano, the CNR president Maria Chiara Carrozza, the director of *Dipartimento Scienze Chimiche e tecnologie dei Materiali* DSCTM CNR Lidia Armelao, and the president of *Società Chimica Italiana* (SCI) Gaetano Guerra. All the representatives of the national and international chemical societies underlined the key role of chemical sciences and innovative materials in the green transition.

The conference was organized in four thematic sessions:

- production and uses of green hydrogen, in which the topics relating to water electrolysis processes and the materials used in these processes and in fuel cells were discussed;
- transport and storage, both through chemical approaches and physical methods and the presentation of case studies;
- production of chemicals with high added value and with green methods, such as the so-called "e-fuels"; and finally
- decarbonization policies, analyzing both the political-regulatory aspects of the issue and the strategic ones.

Finally, particular attention was paid to the most difficult industrial sectors to decarbonize, such as steel, ceramics, glass and cement, which constitute a first, crucial challenge ground for the use of green and blue hydrogen.

The special issue collects some of the reports presented at the conference, and includes:

- "H_2 in the energy transition" by Vito Di Noto *et al.* University of Padova,
- "Rethinking chemical production with green hydrogen" by Gabriele Centi *et al.* University of Messina,
- "Hydrogen storage and handling with hydrides" by Marcello Baricco *et al.* University of Torino,
- "Hydrogen as an energy carrier: constraints and opportunities" by Nicola Armaroli *et al.* National Research Council - Bologna,
- "In-situ and operando Grazing Incidence XAS: a novel set-up and its application to model Pd electrodes for alcohols oxidation" by Alessandro Lavacchi *et al.* National Research Council – Firenze,
- "Watching atoms at work during reactions" by Stefano Agnoli *et al.* University of Padova,

- "Hydrogen production and conversion to chemicals: a zero-carbon puzzle?" by Mario Marchionna SAIPEM – Milano,
- "Shaping the future of green hydrogen: De Nora's electrochemical technologies for fueling the energy transition" by Michele Perego *et al.* De Nora Industries – Milano,
- "Perovskite: a key structure for a sustainable hydrogen economy" by Alessandra Sanson National Research Council – Faenza,
- "Advanced polymer electrolyte membrane water electrolysis for power to gas applications" by Antonino Salvatore Aricò *et al.* National Research Council – Messina.

The proceedings in Italian are published in a dedicated issue of "La Chimica & l'Industria" edited by the Italian Chemical Society (issue 5/2023) <https://www.soc.chim.it/it/riviste/chimica_industria/catalogo>.

https://www.degruyter.com/journal/key/pac/96/4/html

Lectures and session discussions of the Avogadro Colloquia took place in the iconic Marconi Hall of the Consiglio Nazionale delle Ricerche (CNR), Piazzale Aldo Moro, in Roma.

IUPAC Provisional Recommendations

Provisional Recommendations are preliminary drafts of IUPAC recommendations. These drafts encompass topics including terminology, nomenclature, and symbols. Following approval, the final recommendations are published in IUPAC's journal *Pure and Applied Chemistry* (PAC) or in IUPAC books. During the commentary period for Provisional Recommendations, interested parties are encouraged to suggest revisions to the recommendation's author. https://iupac.org/recommendations/under-review-by-the-public/

Glossary of Terms for Mass and Volume in Analytical Chemistry

A glossary of terms and definitions for concepts in the use of mass and volume in analytical chemistry is presented. These include definitions for analytical methods of measurement (gravimetry, volumetry, and titrimetry) and supporting terms. Terms are updates of earlier recommendations or Orange Book entries.

Comments by **31 August 2024**

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Definition of materials chemistry

Materials chemistry is focused on the design, preparation and understanding of innovative materials with useful properties. It is an emerging area of research where definitions are not well established. This document defines the area of materials chemistry for the benefit of chemistry communities and the general public worldwide interested in this discipline. This Recommendation defines the term "materials chemistry" as "Scientific discipline that designs, synthesizes and characterizes materials, with particular interest upon processing and understanding of useful or potentially useful properties displayed by such designed materials."

Comments **by 31 July 2024**

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