

Frontiers in Physical Chemistry for Lignin Valorisation

Burlington House, London, United Kingdom
10–12 September 2025



FARADAY DISCUSSIONS

Volume 263, 2026

The Faraday Community for Physical Chemistry of the Royal Society of Chemistry, previously the Faraday Society, was founded in 1903 to promote the study of sciences lying between chemistry, physics and biology.

Editorial Staff

Executive Editor

Michael A. Rowan

Deputy Editor

Vikki Pritchard

Development Editors

Bee Hockin, Andrea Carolina Ojeda-Porras

Editorial Manager

Gisela Scott

Associate Editorial Manager

Chris Goodall

Publishing Coordinator

Konoya Das

Publishing Editors

Konoya Das and Sophie Mander

Editorial Assistant

Daphne Houston

Publishing Assistants

Huw Hedges and Natalie Ford

Publisher

Sam Keltie

Faraday Discussions (Print ISSN 1359-6640, Electronic ISSN 1364-5498) is published 8 times a year by the Royal Society of Chemistry, Thomas Graham House, Science Park, Milton Road, Cambridge, UK CB4 0WF.

Volume 263 ISBN 978-1-83707-069-5

2026 annual subscription price: print+electronic £1355
US \$2385; electronic only £1291, US \$2272.

Customers in Canada will be subject to a surcharge to cover GST. Customers in the EU subscribing to the electronic version only will be charged VAT.

All orders, with cheques made payable to the Royal Society of Chemistry, should be sent to the Royal Society of Chemistry Order Department, Royal Society of Chemistry, Thomas Graham House, Science Park, Milton Road, Cambridge, CB4 0WF, UK
Tel +44 (0)1223 432398; E-mail orders@rsc.org

If you take an institutional subscription to any Royal Society of Chemistry journal you are entitled to free, site-wide web access to that journal. You can arrange access via Internet Protocol (IP) address at www.rsc.org/ip

Customers should make payments by cheque in sterling payable on a UK clearing bank or in US dollars payable on a US clearing bank.

Whilst this material has been produced with all due care, the Royal Society of Chemistry cannot be held responsible or liable for its accuracy and completeness, nor for any consequences arising from any errors or the use of the information contained in this publication. The publication of advertisements does not constitute any endorsement by the Royal Society of Chemistry or Authors of any products advertised. The views and opinions advanced by contributors do not necessarily reflect those of the Royal Society of Chemistry which shall not be liable for any resulting loss or damage arising as a result of reliance upon this material. The Royal Society of Chemistry is a charity, registered in England and Wales, Number 207890, and a company incorporated in England by Royal Charter (Registered No. RC000524), registered office: Burlington House, Piccadilly, London W1J 0BA, UK, Telephone: +44 (0) 207 4378 6556.

Printed in the UK



Faraday Discussions

Faraday Discussions are unique international discussion meetings that focus on rapidly developing areas of chemistry and its interfaces with other scientific disciplines.

Scientific Committee volume 263

Chair

Roberto Rinaldi, Imperial College
London, UK

Committee

Claudia Crestini, Università Ca' Foscari Venezia, Italy
Jean-Pierre Lindner, BASF SE, Germany
Seema Singh, Air Company, NYC, United States

Faraday Standing Committee on Conferences

Chair

Caroline Dessent, University of
York, UK

Emma Gibson, University of Glasgow,
UK

Secretary

Susan Weatherby, Royal Society of
Chemistry, UK

Julia Lehman, University of
Birmingham, UK
Andrew Mount, University of
Edinburgh, UK

George Booth, King's College
London, UK

David Fermin, University of Bristol,
UK

Julia Weinstein, University of
Sheffield, UK
Martijn Zwijnenburg, University
College London, UK

Advisory Board

Vic Arcus, The University of Waikato,
New Zealand

Timothy Eason, Cardiff University, UK
Dirk Guldí, University of Erlangen-
Nuremberg, Germany

Marina Kuimova, Imperial College
London, UK

Luis Liz-Marzán, CIC biomAGUNE,
Spain

Andrew Mount, University of
Edinburgh, UK

Frank Neese, Max Planck Institute
for Chemical Energy Conversion,
Germany

Michel Orrit, Leiden University,
The Netherlands

Zhong-Qun Tian, Xiamen University,
China

Siva Umaphathy, Indian Institute of
Science, Bangalore, India

Bert Weckhuysen, Utrecht University,
The Netherlands

Julia Weinstein, University of
Sheffield, UK

Sihai Yang, University of Manchester,
UK

Information for Authors

This journal is © the Royal Society of Chemistry 2026. Apart from fair dealing for the purposes of research or private study for non-commercial purposes, or criticism or review, as permitted under the Copyright, Designs and Patents Act 1988 and the Copyright and Related Rights Regulation 2003, this publication may only be reproduced, stored or transmitted, in any form or by any means, with the prior permission in writing of the Publishers or in the case of reprographic reproduction in accordance with the terms of licences issued by the Copyright Licensing Agency in the UK. US copyright law is applicable to users in the USA.

© The paper used in this publication meets the requirements of ANSI/NISO Z39.48-1992 (Permanence of Paper).

Registered charity number: 207890



Frontiers in Physical Chemistry for Lignin Valorisation

Faraday Discussions

www.rsc.org/faraday_d

A General Discussion on Frontiers in Physical Chemistry for Lignin Valorisation was held in London, United Kingdom on the 10th, 11th and 12th of September 2025.

The Royal Society of Chemistry is the world's leading chemistry community. Through our high impact journals and publications we connect the world with the chemical sciences and invest the profits back into the chemistry community.

CONTENTS

ISSN 1359-6640; ISBN 978-1-83707-069-5



Cover

See Yevgen Karpichev *et al.*, *Faraday Discuss.*, 2026, **263**, 445–458.

Functionalization of lignin yields three distinct derivatives, each with unique properties that can influence the characteristics of lignin/PLA composites and expand their applications in 3D printing.

Image reproduced with permission of Mahendra Kothottil Mohan from *Faraday Discuss.*, 2026, **263**, 445–458.

INTRODUCTORY LECTURE

9 Spiers Memorial Lecture: organic, physical & polymer aspects pivotal in lignin valorization

Nicolò Pajer, Claudia Crestini and Dimitris S. Argyropoulos

PAPERS AND DISCUSSIONS

52 Analysing π - π -stacking interactions in lignin nanoparticles from molecular simulations – insights and lessons learned

Klara Hackenstrass, Nil Tabudlong Jonasson, Marie Hartwig-Nair, Tomas Rosén, Sara Florisson and Malin Wohler



SPONSOR



BASF

We create chemistry

POSTER SPONSORSHIP



**Green
Chemistry**



**RSC
Sustainability**





- 65 Comparison of bottom-up and top-down precipitation strategies for lignin nanoparticle obtention from organosolv and ionosolv *Eucalyptus globulus* liquors**
Victoria Rigual, Antonio Ovejero-Pérez, Antonio Martínez-Mangas, Beatriz García-Sánchez, Juan C. Domínguez, M. Virginia Alonso, Mercedes Oliet and Francisco Rodriguez
- 81 Bond dissociation energies of lignin–carbohydrate complexes**
Thomas Elder and Martin Lawoko
- 98 Organosolv processing of Sitka spruce sawdust: large scale preparation of native-like lignin and lignin^{OX} for valorisation**
Daniel J. Davidson, Geraud N. Sansom, Daniel M. Miles-Barrett, David B. Cordes, Alexandra M. Z. Slawin, James R. D. Montgomery, Tomas Lebl, Ann Connor, Andrew M. Danby, Mark J. Gronnow, Neil J. Parry, Sarah L. Hosking, David S. Grainger and Nicholas J. Westwood
- 123 Supramolecular interactions in softwood kraft lignin nanoparticles**
Massimo Sgarzi, Matteo Gigli, Shahzal Babar, Nicolò Pajer, Giorgia Peroni, Claudia Crestini, Nina Tverdokhlebo, Arezoo Dianat, Rafael Gutierrez and Gianaurelio Cuniberti
- 138 Native lignin solvation and extraction: general discussion**
- 164 Spectro-electrochemistry of guaiacol oxidation: tracking intermediates in a membrane-separated cell with *in situ* attenuated total reflectance-infrared spectroscopy**
Sibylle M. K. Schwartzmann, Mariangela Biggiero, Sander Deelen, Bettina Baumgartner and Bert M. Weckhuysen
- 182 Structural purification of technical lignins *via* fractional dissolution using non-azeotropic solvent mixtures**
Reza Ebrahimi Majdar, Federica Ferruti, Marco Orlandi, Claudia Crestini and Heiko Lange
- 199 Predictive modelling and optimization of lignin extraction efficiency and quality in birch-wood mild ethanosolv fractionation in a semi-continuous flow-through reactor**
Amponsah Preko Appiah, Bertran-Llorens Salvador, Pelle van Aefst and Peter J. Deuss
- 221 Mass-resolved UV–Vis–GPC mapping diagnoses catalyst ageing in RCF lignin streams**
Siyuan Gao, Raul Rincken, Robert T. Woodward, Jie Bao and Roberto Rinaldi
- 245 Efficient hydrogenolysis of lignocellulose into phenolic monomers over a CuO/m-ZrO₂ catalyst**
Peng Qi, Qiang Wang, Zi-Mu Liu, Peng Zhu, Jing-Shu Dong, Jun-li Ren, Yu-Meng Wang, Ling-Ping Xiao and Run-Cang Sun
- 259 Lignin stabilisation and degradation in lignocellulosic fractionation processes: general discussion**
- 281 Odor-free kraft lignin-based thermoset with remarkable mechanical properties**
Alexander Orebom, Aditya Babu, Zoya Zarafshani, Willem Böttger, Joseph S. M. Samec and Pierre Munier

- 294 **The use of kraft lignin to enhance nanocellulose film properties**
Raquel Martín-Sampedro, Antonio Ovejero-Pérez, Mercedes Oliet, Virginia Alonso, Francisco Rodríguez, David Ibarra and María E. Eugenio
- 319 **An empirical assessment of the physicochemical properties of lignin solutions in aqueous sodium hydroxide – corroboration and demystification of some widely accepted statements**
Antonio L. Alves and Veronica Calado
- 336 **From dark to light: light-coloured lignin for cultural heritage conservation**
Felipe F. Meneses, Camilla H. M. Camargos and Camila A. Rezende
- 358 **Commercially available technical lignins: general discussion**
- 374 **In-depth analysis of kraft lignin epoxy thermosets**
Saeid Nikafshar, Kevin Dunne, Sajad Nikafshar and Mojgan Nejad
- 399 **Molecular weight dependent water uptake and dynamics in lignin-based epoxy anticorrosive coatings**
Azade Kafashan, Timon Binger, Markus Schackmann, Kim Dam-Johansen and Narayanan Rajagopalan
- 426 **Hot-drawing ionic liquid-spun lignin–poly(vinyl alcohol) fibres increases strength and polymer alignment**
Enny Tran, Joanne Pui Fai Ng, Lucie Diéval, Stéphan Rouzière, Pascale Launois, Milo S. P. Shaffer and Agnieszka Brandt-Talbot
- 445 **Tuning ester derivatives of organosolv vs. technical lignin for improved thermoplastic materials**
Mahendra Kothottil Mohan, T. Tran Ho, Carmen Köster, Oliver Järvik, Maria Kulp and Yevgen Karpichev
- 459 **Strategies for compatibilisation of extracted lignin properties with commercial applications: general discussion**

CONCLUDING REMARKS

- 479 **Concluding remarks: *Faraday Discussion* on Frontiers in physical chemistry in lignin valorization**
Katalin Barta

ADDITIONAL INFORMATION

- 498 **Poster titles**
- 502 **List of participants**

