



EMERALD ISLE
CONFERENCE
ON SUSTAINABLE
CHEMISTRY &
ENGINEERING

9-11 April 2025

Belfast



QUEEN'S
UNIVERSITY
BELFAST

Conference Programme and Book of Abstracts

Sponsored by



QUEEN'S
UNIVERSITY
BELFAST

GORDON AND BETTY
MOORE
FOUNDATION



ACS Publications
Most Trusted. Most Cited. Most Read.



ACS Green Chemistry Institute
Chemistry for Life®



ROYAL SOCIETY
OF CHEMISTRY

SURFACE REACTIVITY
AND CATALYSIS
GROUP



RSC LOCAL SECTION
NORTHERN IRELAND

Asynt



ALMAC

Partnering to Advance Human Health

Conference Programme

Day One – 9th April 2025

11:00	Registration
13:00	Welcome and Introduction Panagiotis Manesiotis, Haresh Manyar, Andrew Marr, Patricia Marr
13:20	Global Thought Leaders Panel Discussion Chairs - Andrew Marr, Patricia Marr
15:20	<i>The 40 Shades of Green Chemistry</i> Paul Anastas Yale University Chair - Andrew Marr
16:00	Coffee Break
16:30	<i>TBC</i> Julie Zimmerman Yale University Chair - Patricia Marr
17:10	Delegate Information Session Haresh Manyar
17:20	Reception - Poster Session and Exhibitors Sponsored by Almac
19:00	Day One - Close
20:00	Conference Delegate Banquet

Day Two – 10th April 2025

08:50 Welcome and Introduction

Session Chair - Patricia Marr

09:00 *Teaching Green Chemistry in a Changing World*
Martyn Poliakoff
University of Nottingham

09:40 *Bio-Based Platform Chemicals from Local Plant Oils by Selective Semi-Hydrogenation and Homogeneous Catalysis*
Thomas Seidensticker
TU Dortmund

10:00 *Accelerating Development of Green Chemistry Technologies Through Cross-Sector Collaboration*
Adelina Voutchkova
ACS Green Chemistry Institute

10:40 Coffee Break

Session Chair - Andrew Marr

11:00 *From Flexible to Adaptive: Dynamic Systems to Control the Performance of Catalysts*
Walter Leitner
Max Planck Institute for Chemical Energy Conversion

11:40 *Sustainable Chemistry & Engineering for Education, Outreach and Recruitment*
Kevin Morgan
Queen's University Belfast

12:00 *Electrochemical Biomass Depolymerization: Will Complex Catalysts Trigger High Product Selectivity?*
Adam Slabon
Bergische Universität Wuppertal

Flash Session One

James Metcalf *Atmospheric Degradation of New “Green” Solvents*

12:20 Philippa Jacob *Machine Learning for Polymer Biodegradability*

Víctor Sans Sangorrín *Digital Synthetic Platforms for the Efficient Capture and Valorisation of Carbon Dioxide into Added Valued Chemicals*

12:50 *Sustainable Monomers and Polymers*
Steve Howdle
University of Nottingham

13:10 Lunch

Session Chair - Gosia Swadźba-Kwaśny

14:00 *Sustainability: Who Gives a Cr*p?*
Mike George
University of Nottingham

14:40 *Small but Feisty: How Singapore Turns CO2 Problems into Greener Solutions*
Bella
Institute of Sustainability for Chemicals, Energy and Environment (ISCE²)

15:00 *New Ways of Building Carbon Chains - From Fischer Tropsch to New Synthetic Routes*
Andreas J. Vorholt
Max Planck Institute for Chemical Energy Conversion

15:20 *Genes to GMP: How API Manufacture is ‘Going Green’ with Engineered Enzymes*
Stefan Mix
Almac

15:40 Coffee Break

16:00 *Biobased Reversible Photo-Responsive Polymers for Useful Applications*
Antonio Patti
Monash University

16:20 *Ionic Liquids Technology for Polyurethane Foam Waste Depolymerization*
Pedro Lozano Rodriguez
University of Murcia

Session Chair - Haresh Manyar

Flash Session Two

16:40	Jane Mueller	<i>IN Silico Informed metaGenomic Harvesting Technology - (INSIGHT) - How a Smart Platform Can Accelerate the Timelines of Genes-to-GMP</i>
	Thomas Freese	<i>Photochemical Production of Bio-Based Building Blocks as Acrylate Replacements</i>
	Shanika Yadav	<i>Inspiring Innovation in Green Chemistry - Startup Support Network KOALA</i>

17:10 *Crude Glycerol – Microbial Substrate for Production of Intermediates and Recombinant Enzymes*
Martin Rebroš
Slovak University of Technology

17:30 *Green Catalytic Chemistry for the Energy Transition*
Johannes A. Lercher
TU München

18:10 Poster Session and Exhibitors
Sponsored by Institute of Chemistry of Ireland

19:30 Day Two - Close

Day Three – 11th April 2025

08:50 Welcome and Introduction

Session Chair – Gary Sheldrake

09:00 *Hotspot Driven Research in Green and Sustainable Chemistry*
Philip Jessop
Queen's University at Kingston

Flash Session Three

09:40	Elisa Isabel García-López	<i>Carbon Nitride Based Composites Photocatalysts Prepared with Materials Arising from Spent Li-Batteries for the Photoreforming of Biomass Residues</i>
	Sarmad Ahmad Qamar	<i>Bioplastics from 'Annurca' Apple Cellulose Doped with Polyphenolic Compounds for 'Active' Food Packaging Applications</i>
	Neil Robinson	<i>Measuring Nuclear Spin Dynamics in Sustainable Engineering Systems</i>

10:10 *Recent Developments in Asymmetric Synthesis and Catalysis*
Pat Guiry
University College Dublin

10:50 Coffee Break

Carbon nitride based composites photocatalysts prepared with materials arising from spent Li-batteries for the photoreforming of biomass residues

E.I. García-López¹, N. Aoun¹, G. Marcì¹, G. Itri², E. Paone², F. Mauriello²

¹ *Dipartimento di Ingegneria, Università di Palermo, Italy*

² *Dipartimento DICEAM, Università degli Studi Mediterranea di Reggio Calabria, IT89123*

Reggio Calabria, Italy

elisaisabel.garcialopez@unipa.it

Keywords: Li-spent batteries, waste valorisation; photocatalysis; H₂

There is a justified enhanced interest in sustainable technologies that integrate renewable resources. In this context, the development of processes for the valorisation of spent lithium-ion batteries (s-LIB) is an urgent issue [1]. In the current work innovative materials, as graphitic carbon nitride (g-C₃N₄) enriched with a metal-based co-catalyst obtained from the mixture of anode and cathode powders (black mass (BM)) contained into the spent s-LIBs are prepared. The photoreforming technology is aimed to obtain H₂ from water and simultaneously oxidizing organic molecules to higher added-value substances in the presence of semiconductors as C₃N₄ [2]. Graphitic carbon nitride (g-C₃N₄) possesses optimal characteristics as a photocatalyst even under solar irradiation, and its coupling with various materials as graphene [3] or TiO₂ [4] improve the H₂ productivity by photoreforming. In this research, BM from s-LIB, containing mainly Co, was used pristine or activated and g-C₃N₄ was prepared by calcination of melamine, urea, thiourea or dicyanamide. Various sets of composites were prepared by different strategies to obtain g-C₃N₄/BM photocatalysts with an amount of BM enough to bring to the composite a content of Co in the range 0.5 to 2 % w/w. Additionally, hydrochar (HC) obtained from the hydrothermal combustion of orange peel waste was also used as a co-catalyst. The obtained materials were tested for H₂ production using aqueous solutions of ethanol, glycerol or triethanolamine irradiated with UV or natural solar light. Photoreactivity was performed in the absence or presence of 1% Pt. The best results were obtained with catalysts containing g-C₃N₄ with a 1% of Co from the BM that gave a H₂ productivity of 2.2 mmol h⁻¹ g⁻¹. The further calcination of the composite doubled the H₂ productivity.

[1] E. Paone, M. Miceli, et al., ACS Sustain. Chem. Eng. 2022, 10 (7), 2275-2281.

[2] E.I. García-López, L. Palmisano, G. Marcì, ChemEng. 2023, 7, 11

[3] E.I. García-López, P. Lo Meo, A. Di Vincenzo, L. Palmisano, G. Marcì, Catal. Today 2023, 413-415, 113965

[4] E.I. García-López, A. Genco, V. Lagostina, M.C. Paganini, G. Marcì, Catal. Today 2023, 423, 114283.