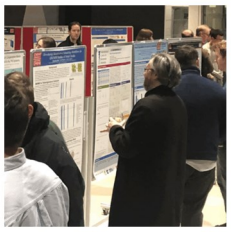
NewsLetter

FEBRUARY 2024
ISSUE 5

DROCHAID RESEARCH SERVICES LTD



Dr Cathy Dwyer attends Cardiff Catalysis Institute Annual Meeting

Brian Boardman's Retirement

Dr Jianke Liu attends
IBioIC and Scottish Fermentation Networks
12th Meeting

Drochaid Member of the Board, Mr Derek Watson
is awarded
an MBE (Member of the Order of the British Empire)

Dr David Smith's holiday
in Austria

Drochaid Research Services case study in:
Rapid and economical synthesis of materials using microwave reactor
By Dr David Brown

Drochaid
Holiday photo's page

DROCHAID RESEARCH SERVICES LTD

Brian, Friend and Colleague retires from Drochaid

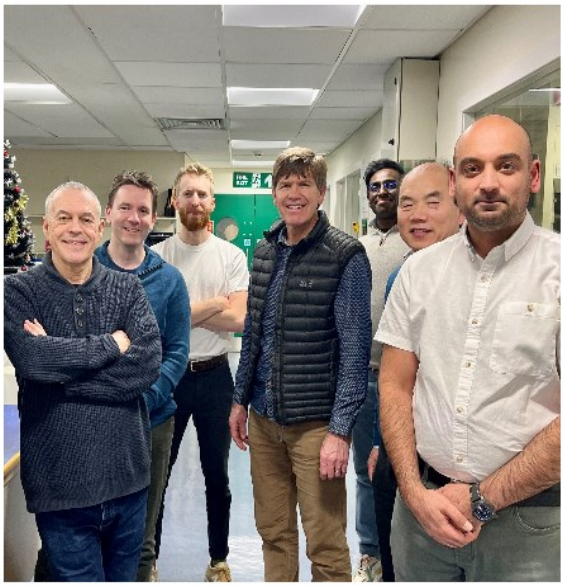
BRIAN BOARDMAN

It's was a poignant moment for all of us when Brian retired after dedicating many years of service to Drochaid Research. His contributions and friendship leave an indelible mark here at Drochaid.

As Brian steps into a new chapter of his life, we all at Drochaid celebrate his achievements and we wish our already missed friend well on his journey ahead.

"Despite our wish to contribute comments and memories about Brian from all of us at Drochaid Research and include the many heartfelt messages on LinkedIn space constraints prevent us. But we have ensured that Brian has copies and read of all these lovely posts dedicated to him"

The Legend that is Brian Broadman



HIS CRAFTMANSHIP AND LEGACY
WILL OUTLIVE MANY OF US....

Dr Hendrik van Rensburg

Dr Jianke Liu visits Glasgow for IBioIC and Scottish Fermentation Networks 12th Meeting.

Dr Jianke Liu

The Scottish Fermentation Network's 12th Meeting is a one-day conference on sustainable bio-based chemicals production.
The event is organized by IBioIC and aims to promote the production of bio-based chemicals in a low carbon future
The meeting was held at Strathclyde University's Technology & Innovation Centre in early November '23.
The conference was attended by professionals from academia and industry, who shared their knowledge and experiences in the field of bio-based chemicals production

Dr Jianke Liu commented:

It's wonderful to hear about the exciting developments in the biotechnology sector! Two particularly interesting areas of research areas practiced are:

Sustainable Biosynthesis of Polyhydroxybutyrate (PHB) and Vanillin from PET Plastic Waste:

Dr Joanna Sadler from the University of Edinburgh is making strides in sustainable biosynthesis. She focuses on converting **PET plastic waste** into valuable compounds.

Polyhydroxybutyrate (PHB), a biodegradable polymer, can be produced from waste materials. It has applications in various fields, including packaging and medical devices.

Additionally, Dr. Sadler explores the biosynthesis of **vanillin**, a key flavour compound found in vanilla. By utilizing PET waste, she contributes to a more circular economy.

This research aligns with the goal of achieving a **fossil-free future** by repurposing existing materials and reducing reliance on petrochemicals.

Industrial Fermentation Processes for Carbon Capture, Utilization, and Storage (CCUS):

Dr Ellis Robb, of Ingenza, sheds light on innovative fermentation techniques.

One interesting case study involves **fixed bed continuous formate production technology**, developed in collaboration with Johnson Matthey.

Formate, a chemical compound, has potential applications in energy storage and as a building block for other chemicals.

Drochaid supported the early phase research years ago carrying out biosynthesis under pressure using conventional autoclave chemical reactors.

By harnessing microbial processes, this research contributes to a more sustainable and **fossil-free** future.

These efforts demonstrate how **biotechnology** might pave the way toward a cleaner, greener world. "After all, the ability to convert inorganic carbon into valuable chemicals is fundamental to life as we know it". Keep up the inspiring work!

Dr Cathy Dwyer MD attends
Cardiff Catalysis Institute Annual Meeting
January 2024

In January, Cathy Dwyer participated in the Cardiff Catalysis Institute's annual conference. The event drew a substantial audience of UK and European academics as well as industry representatives, underscoring the CCI's global impact in the field of catalysis research. Notably, Cathy reconnected with familiar faces, including:

- Prof Graham Hutchings from Cardiff University.
- Prof Phil Dyer from Durham University.
- Dr Ronan Bellabarba from Topsoe.
- Dr Michael Bender from BASF.

The conference featured diverse presentations covering topics such as interfacial and tandem catalysis, computational chemistry, and catalyst characterization studies. Attendees gained insights into the fundamental aspects of catalysts. The conference took place near the impressive Translational Research Hub building, which houses most of the CCI's research facilities. A highlight of Cathy's visit was a guided tour of these cutting-edge labs, led by Prof Duncan Wass.

Rapid and economical synthesis of materials using microwave reactor

- Synthesis of metal nanoparticles using microwave energy
- Calcination of metal precursors in a microwave reactor
- Facile removal of organic species from supports using microwave energy

Background

The past two decades have seen a significant increase in the use of microwave energy to carry out organic transformations. Microwave heating has been shown to dramatically reduce reaction times from days to minutes, increase product yields and enhance product purities by reducing unwanted side reactions when compared to conventional heating methods.

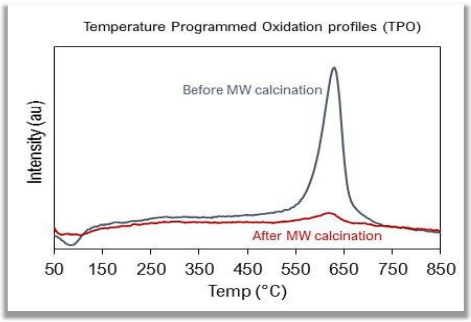
Apart from organic/medicinal chemistry this technology has penetrated several other fields such as materials science, nanotechnology and biochemical processes. Microwave radiation directly and rapidly heats microwave active molecules to high temperatures, quickly exceeding kinetic barriers and dramatically accelerating reaction rates.

Challenge

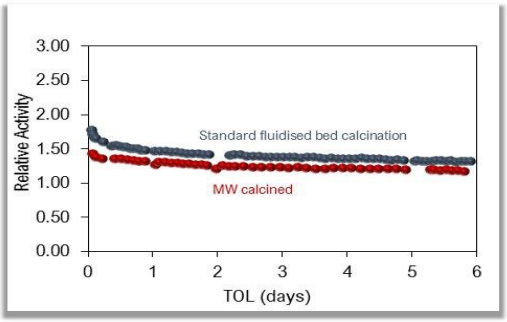
Organic impurities from the surface of inorganic carriers used as supports are conventionally calcined in a furnace, requiring high temperatures (above 500 °C) to remove carbonaceous species.

In most of the cases, metal salts impregnated on inorganic carriers require an air calcination step to produce metal oxides which are later treated under specific conditions prior the reaction. This calcination step is usually carried out at high temperature (above 400 °C) and for several hours.

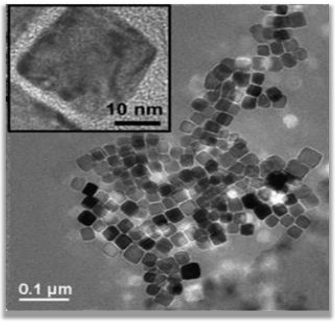
Well-defined metallic nanoparticles are prepared following colloidal protocols whose reaction times can vary between minutes to several days depending on the metal and conditions.



Decrease in carbonaceous impurities by heating at 120 W for 20 mins.



Comparable activity of a commercial catalyst calcined in a furnace for 10 h and that same catalyst microwave calcined in 5min.



Cobalt oxide particles with uniform size were synthesized in 30 mins, compared to the 72 h required when using conventional heating.

"Microwave is an effective alternative to the traditional heating, enabling higher heating rate, homogeneous heat distribution and remarkable energy and time saving" *Dr David Brown*

Drochaid Member of the Board, Mr Derek Watson is awarded an MBE (Member of the Order of the British Empire)

CONGRATULATIONS ON YOUR ACHIEVEMENT!

Derek Watson, the Chief Operating Officer, Quaestor, Factor of St Andrews Innovation, and member of the board of Drochaid, has been recognized for his outstanding contributions.

He was awarded an MBE (Member of the Order of the British Empire) for his services to Entrepreneurship and Sustainability. His dedication to fostering entrepreneurship and promoting sustainable practices has been acknowledged and celebrated. Derek expressed his gratitude, emphasizing the collective effort of the team at St Andrews Innovation and the Eden Campus.

Notably, the University of St Andrews has been at the forefront of sustainability initiatives, including the path to net zero, carbon sequestration through nature-based solutions, and biodiversity enhancement. Derek's work exemplifies the leadership and positive impact that the University is making in these critical areas.

Dr David Smith returns from his holiday in Austria

DR DAVID SMITH AND HIS BEAUTIFUL DAUGHTER ON HOLIDAY IN AUSTRIA

It's good to hear that Dr David Smith had an enjoyable skiing holiday with his family in Austria.

Dr David Smith told us that he did not have a single fall—impressive.

Although it seems his daughter is quite the skiing prodigy, matching and easily surpassing her dad's skills on the slopes.

Derick Whyte, Bill MacDonald and Cathy Dwyer shares their holiday photo's

Drochaid Holiday Snaps

Chairman of the Board Derick Whyte visited Patagonia, and is seen here posing with a large toy llama…

Our MD, Cathy Dwyer at Balnuith Alpaca farm where she took a liking to these donkeys with their natural dreadlocks

Board member Bill MacDonald looking a little uneasy at his grasshopper taco on a trip to Mexico

DROCHAID RESEARCH SERVICES LTD

Contact Us

Drochaid Research Services
Purdie Building
North Haugh
St Andrews KY16 9ST

Phone: 01334 460930
Email: info@drochaidresearch.com

DROCHAID RESEARCH SERVICES

We are always pleased to hear from our customers,
business enquiries, students and new friends