

IMFORMATION OCTOBER 2025



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IMF DIARY

DISTANCE LEARNING ENROLMENT DATES

8 Jan 2026 for Start 16 Jan 2026

Please note that all course fees must be paid in full before any course materials can be released.

Please email training@materialsfinishing.org

You can find details of courses and qualifications on our website- https://materials-finishing.org/

UPCOMING EVENTS

IMF AGM 2025

19th November

See details in later pages







SECRETARY GENERAL'S COLUMN (i)

Greetings from my new office at my home in Cyprus; its 9.30am on a sunny October morning and the temperature promises to be in the mid 20's.

Its quite amazing how easily one can fit into a new lifestyle; the view from my office is over fields to green hills, which makes such a peasant change compared to industrial Sparkhill in Birmingham! I'm sure I can be more productive here!!



The great benefit of modern communications

systems mean I can work just as smoothly from here as I used to in the UK; already this morning I've managed 2 phone calls with colleagues in the UK. Being here doesn't mean I will loose touch with everything and everyone on the UK, and I will be with you all at the Annual General Meeting on November 19th. I look forward to catching up with as many of you as possible, as we bring to a close our 100th year as an Institute. I am also looking to attend the Advanced Engineering show at the NEC, being held on Wednesday and Thursday, 29th/30th October.

I apologise if your copy of IMFormation is a little late this month; Helen has been chasing me for my column but I was delayed by both travelling over here, and also



Halcyon Environmental

Environmental and H&S Consultancy Services

CoSHH, CONAW, COAAW, 14001 18001

Tel: 01902 743673

E-mail: tim@halcyonenvironmental.co.uk attending the OCCA technical conference, Surcon, last week at Warwick University. This was a very interesting two days, and its pleasing to note that that there is still some amazing research being carried out into advanced materials with an emphasis on "green" chemistry and sustainability.

Most of you will not be aware but I have finally retired from gainful employment; I finally parted company from Indestructible at the end of August. However, like most time served people from the paint and

coatings industries I have set up my own consultancy business, with a 12



SECRETARY GENERAL'S COLUMN (ii)

month retainer from IP, but I also intend to continue offering technical and applications training in paint, organised in conjunction with the IMF. Please remember me if you need these services!

Being away from the UK doesn't mean I'm out of touch with the business situation of our members, and I'm told there is still a lack of vibrancy within our industry; the political changes of the last year certainly haven't helped and I worry there may be more pain after next months budget. I can only hope any changes in taxation rules won't have too negative an effect on business.

It seems to be forgotten but we still need an active coatings industry; most items in our world need to have some form of surface coating to be fully functional, and perhaps we need to stress this more positively. I'm aware our past president, Karl Ryder, and his team on the science committee meet with the parliamentary science group, but I wonder if our politicians fully realise the importance of the coatings industry. If any members have any thoughts on how the Institute could work on this, I would welcome suggestions. Prior to the change of government last year, I had been involved with the BCF in lobbying the pervious government on the importance then of the paint industry to UK Plc. I'm not aware if this lobbying is continuing with the present government, but I will check with my contacts at the BCF and ascertain if the IMF can help.

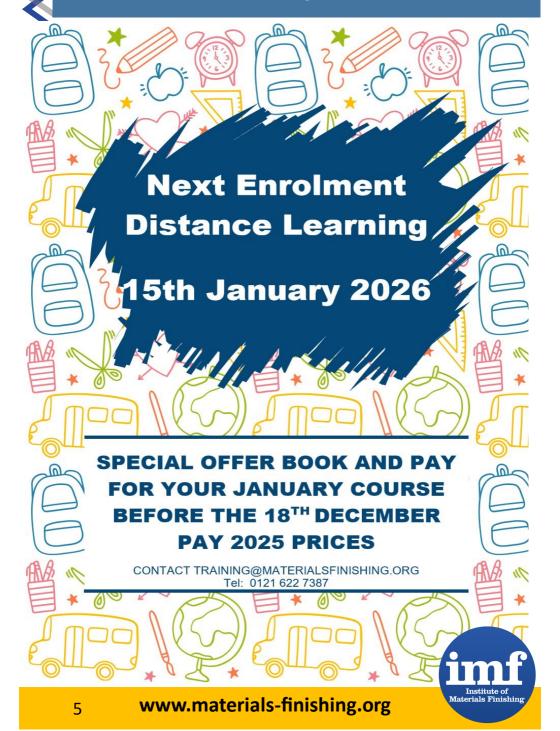
Graham Armstrong

October 2025









EDUCATION & TRAINING (i)

DISTANCE LEARNING A

Foundation Module Basic Surface Finishing

Develops fundamental understanding from 29 Units of which a student studies 15, including 7 mandatory units. One of three core technology blocks are chosen, either **Electroplating** (8,9,10 & 18); **Organic Coating** (19, 20, 21, 22, & 23); or **Aerospace Finishing** (19, 21, 23, 24 & 25), each comprising 5 units plus 3 optional units relevant to the student or their employer – all units are listed below.

Two pieces of marked coursework are required and on passing an examination a student is awarded the **Foundation Certificate.**

Unit 1 *	Surface Finishing	Unit 16	Alloy Plating & Composites
Unit 2 *	Corrosion	Unit 17	Printed Circuit Board Processes
Unit 3 *	The Environment & Surface Finishing	Unit 18	Electroplating - Care & Maintenance of
Unit 4 *	Health and Safety		Solutions & Product Quality
Unit 5 *	Cleaning and Pre-treatment	Unit 19	Conventional Paint Processes
Unit 6 *	Sacrificial Coatings	Unit 20	Electrophoretic Paint Processes
Unit 7 *	Services	Unit 21	Paint Application Methods
Unit 8	Surface Improvement	Unit 22	Coating Powders & Application
Unit 9	Principles & use of Electroplating - double unit	Unit 23	Testing Paint & Powder & Coatings
Unit 10	Plant and Equipment	Unit 24	Chemical Conversion Coatings and
Unit 11	Copper, Silver and Gold Plating		Sol Gel Coatings
Unit 12	Nickel Plating	Unit 25	Anodising of Aluminium & Alloys
Unit 13	Chromium Plating	Unit 26	Vacuum Coating Processes
Unit 14	Zinc & Cadmium Plating & Passivation	Unit 27	Duplex Coatings of Galvanising plus Paint
Unit 15	Electroless Plating	Unit 28	Electroforming
		Unit 29	Nanotechnology

* Mandatory units

On achievement of the **Foundation Certificate** candidates may wish to progress to the **Technician level modules**, please see over the page for details.



EDUCATION & TRAINING (ii)



Technician Modules

Develops in-depth knowledge for key finishing technologies and their application and best practice methods.

Principles of Electroplating Broad introduction to electroplating technology

Electroplating Practice Industrial application of major metals and supporting pre-treatments for electroplating

and electroless deposition

Paints, Lacquers & Varnishes Application methods, equipment, curing, drying and testing of solvent and water based

industrial finishing processes

Powder Coating Application methods, testing, environmental, health & safety topics

Environment, Health & Safety Legislation information on environmental, health & safety topics

Materials Science Manufacture, properties and examination of materials which require various forms of

coating or treatment to meet service life needs

Automotive Surface Finishing Applications specific to the automotive industry

Electroforming How electroforming can be used to manufacture components and tooling

On successful completion of four marked assignments and passing an examination, a student is awarded a **Technician Module** certificate.

Passing two Technician modules leads to the award of Technician Certificate.

Passing four Technician modules leads to the award of Advanced Technician Certificate.

For more comprehensive details of all modules offered please refer to the IMF website www.materialsfinishing.org where you find the full syllabus for each module.



IMF AGM 2025

19th November



To be held at
Manor Hotel Meriden
Main road
Solihull
CV7 7NH



10.45 am - Arrival - Coffee and Biscuits on arrival.

11.00 am – Morning Session Commences

2 lectures followed by Presentation of awards.

12.30 pm - Break for Lunch

1.45 pm - Afternoon Session Commences

MATERIALS IN SPACE (i)



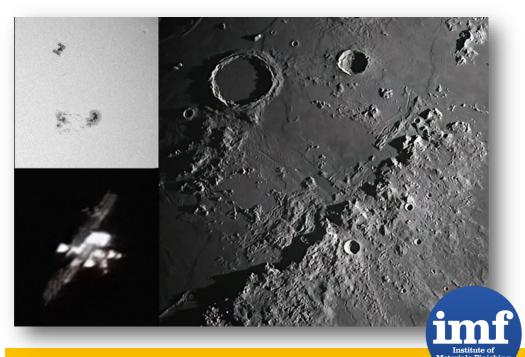
The IMF Southern Branch held an online presentation on "Materials in Space" on 10 September, 2025 to an appreciated and receptive audience. Below is a summary of the presentation.

The Southern Branch has further online presentations planned for 2026, including Trivalent Chrome Electroplating, Review of a Hovercraft Museum, Additive Manufacturing and more. We will also be catching up with previous presentations with reports for IMFormation. Stay tuned!

Materials In Space

John Arnold, Leeds Astronomical Society

Presented to IMF Southern Branch, 10, September, 2025



MATERIALS IN SPACE (ii)

Space is becoming increasingly important. We rely more and more on satellite communications for many aspects of everyday life, from financial transactions to navigation. The number of satellites orbiting the Earth is rapidly and seemingly exponentially increasing, and there is the prospect of the militarisation of space as international tensions ratchet up. More and more spacecraft are being built and launched. A wide range of material and coating science problems are encountered in space travel, e.g. can a material withstand the thermal demands? Is it light enough, yet still adequately strong? Can it withstand radiation?

Materials used within a crewed spacecraft need to be non-flammable, a lesson that should have been learnt from the bitter experience of the Apollo 1 fire in 1967. Yet recently the troubled Boeing Starliner capsule was found to contain hundreds of feet of potentially flammable protective tape. Evidently some lessons require continued learning.

Return to Earth from orbit requires losing a velocity relative to the ground of around 17,000 mph, which is mostly done by ploughing through the atmosphere. This is re-entry, which generates enormous heat, and a craft is generally protected by some sort of heat shield. This can an ablative material, the gas created as it vaporises effectively acting as a blanket. Direct return from the moon involves an even faster re-entry, requiring an even more effective heat shield. Apollo command modules repeatedly demonstrated this. Recently heat shield problems were encountered in the first flight of the Artemis programme, an un-manned test flight around the moon and back. The heat shield degraded in an unexpected manner, later found to involve vaporised material being unable to escape the heat shield matrix. SpaceX have experimented with various protective tiles for their starship (for which there is commercial sensitivity), and of

course the tiles on the now retired space shuttle were notoriously fragile. *Columbia* was lost after crucial tiles were damaged on launch.



MATERIALS IN SPACE (iii)

Many spacecraft appear to be covered in gold foil. In fact this is a multi-layered fabric material which minimises heat loss due to infra-red emission from whatever the foil is covering. Of course there can also be a requirement for mechanical strength, with a metal hull, such as aluminium and titanium alloys, which are light and strong. Recently SpaceX have used polished stainless steel for the hulls of its Starship and Superheavy booster. This is relatively easy to manufacture and has the required strength under both hot and cold conditions. It can also be un-painted, which saves weight. Having used 301 and then 304L stainless steels, SpaceX now uses its own proprietary alloy.

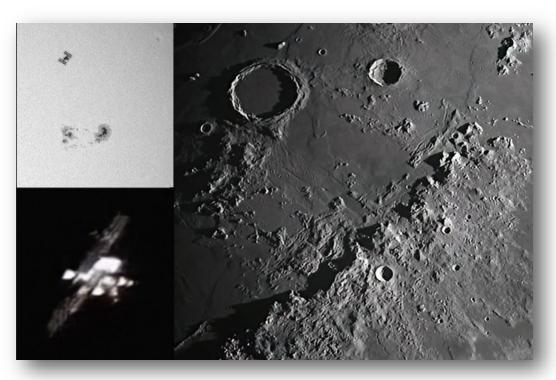
Any spacecraft in the vicinity of Jupiter needs to cope with the high levels of radiation there, which is trapped by the planet's gravity. Electronics need to be shielded, yet the weight of this protection must be within the 'mass budget' of the spacecraft. The NASA Juno probe, currently in orbit around Jupiter, has its sensitive electronics housed in a titanium box with walls 1 cm thick. Earth also has radiation belts (though not as strong as Jupiter's), so satellites in certain higher orbits need to be radiation hardened. Details have become security sensitive, since potential anti-satellite weapons include electro magnetic pulse, which will "knock" out electronic systems.

In due course, humans will return to the Moon, either led by the USA or, perhaps with their somewhat more focussed and coherent approach, the Chinese. Lunar surface explorers will face the added hazard of the ubiquitous dust of the lunar regolith. This highly abrasive and fine dust clings to spacesuits and equipment, due to static electricity. For the Apollo astronauts it was a nasty inconvenience but longer stays will require proper remediation. Most likely this will involve a conductive outermost suit layer to neutralise the charged dust. When the Artemis lunar suits were unveiled in 2023, an outer cover concealed this. The Chinese face the same problem, hence the secrecy.

MATERIALS IN SPACE (iv)

These are just a few of the many aspects of space materials. In order to boldly go anywhere in space, there are numerous materials problems to solve. And after all that, perhaps humanity can live long and prosper!

Figure legend: Clockwise from upper left: the International Space station seen against the background of the solar disc - the source of much dangerous radiation, the Moon is covered in a particularly nasty abrasive dust, the 20 plus year old International Space Station is wearing out, as materials fail.





SURFACE WORLD

Surface World 2027

Surface World - March 2027.

Surface World is returning to the NEC, Birmingham.

We look forward to seeing you at the next event in March 2027.

The exhibition is the UK's only event dedicated to the surface treatment, product finishing and coatings industry. It provides a major showcase for the very latest technology and developments in this important and expanding area.

NB. Surface World Live is sponsored by Surface World magazine and supported by all the major industry organisations including: The SEA, BSTSA, The IMF, Correx, The BCF, RAPRA, Qualicoat UK & Ireland, The Galvanizers Association, and Corrodere Academy.



If you would like to exhibit at Surface World, please call Nigel Bean on 01442 826826 to ask about stand availability.

WASTE STREAM MANAGEMENT



West Midlands Resource Reuse Network

Since April 2024, the West Midlands Combined Authority (WMCA) has been piloting an approach to industrial symbiosis in the region through the West Midlands Resource Reuse Network (WMRRN).

Industrial symbiosis refers to an approach to industrial decarbonisation which involves matching businesses together so that waste products (e.g. wastewater sludge, sand and metals) can be reused in other sectors and industries. Support is available to companies managing these waste streams with the potential to generate impact including cost and carbon savings, new revenue streams, job creation, waste reduction, resource efficiency and social value creation.

If you operate in the food and drink, water utilities, construction, cast metal foundries, metal surface treatment, agriculture, and battery production sectors, then the project would love to hear from you!

More details on the West Midlands resource reuse network





JOHN BURGESSES MEMORIES CONTINUED (i)

Life nearly ended with a "Bang"

An opportunity came up to work as the chief chemist at an electronics company in Southampton which after the interview I "got the job"

The company were moving from small premises into a much larger set up and I was very involved in the setting up of the plant and chemistry. One of my roles was to look at new chemistry and the company had started to produce multilayer backplanes which involved the use of the black oxide process.

The inner layers are usually made from copper clad epoxy resin which has been printed and etched to form the circuitry. In order to ensure the copper circuits adhered well to the next layer via the bonding process, it was necessary to produce a key on the copper material.

trackwork



copper processed through the black oxide solution which consisted of a powerful oxidising agent in an alkaline solution. This oxidation process converted the top layer of the copper into black copper oxide giving it a black crystalline oxide structure allowing for the "glue" to flow through and increased the adhesion between the layers. We had found that different processes produced different thicknesses of lattice so we decided to look at various other suppliers processes in order to get the best for us.

was

I carried out the work in the laboratory and through the different trials I amassed a reasonable volume of solution. Because of the nature of the chemistry (and even though the volumes were not large) it was not right to put the solution down the drain so a further part of the investigation was to see how the solution could be effluent treated.

Most of the processes for treatment involved neutralisation using 500g/l sodium thiosulphate and this was added to the diluted oxide solution.

I followed the instructions as laid down the in the data sheet placing the oxide solution on a stirrer hot plate and adding slowly the thiosulphate solution. Each time the solution was added there was a reaction and after



The

JOHN BURGESSES MEMORIES CONTINUED (ii)

the third addition the reaction was followed up by an enormous bang with the solution going over my lab coat especially the left arm. Knowing that it was caustic based I decide to run out to the shower in the works, remove the lab coat and pull the cord. Looking down I noticed that the draining water was red in colour and one of the workers, who was first aid trained, shouted "grab his right arm" and it was at this point I could see blood pumping out. The ambulance was called and I was taken to Southampton General hospital which by then I was feeling pretty light headed but was determined not to pass out.

As I gave blood I knew that my group was A+ so they filled me back up with apparently 3.5 pints stopped the bleeding and had to await the doctor. He duly arrived and jokingly moaned at me for making a mess over the hospital floor and proceeded to examine my arms and chest area. He said that there was a large piece of glass in my chest which he duly removed and stitched me back up. He then proceeded to the cause of the leak which was down to a cut artery just above my right elbow and told me that it he may have to take me down to theatre to have it stitched. It was at this point I said to him that if he did this when could I leave the hospital. Now the accident was Thursday and he said possibly Monday to which I replied "think again as I had booked to see my favourite group The Shadows at the Bournemouth International Centre of Sunday. His reply was I'll see what I can do.



Obviously when you lose so much blood you tend to make a mess of one's clothes. The sister and junior nurse came to tidy me up as my wife had arrived and she felt I needed to look my best. As blood seemed to get everywhere she politely suggested that she would have to remove my underpants to which I replied that if she could find anything down there that worked let me know. She was in stitches of laughter and said she wished all her patients were as understanding as me to which I said "well you have saved my life for which I am eternally grateful". To say

it was a close call was an understatement and obviously there was a lot of enquiries into what happened but everything got resolved.

Just to let you know that I did see the Shadows on the Sunday which cheered me up no end.



CHEMISTRY at LEICESTER (from SCIENCE in PARLIAMENT) (i)

CHEMISTRY

A century of chemistry at Leicester:

Past, present and future impact

...imagine, for a moment, a world without cleaning products and sanitation, a world without healthcare, drugs, without smart-phones, fuels, transport and batteries. This would be your world without chemistry!

In May 2025, the University of Leicester marked the centenary of its School of Chemistry with a major celebration. Alumni, staff, students, and friends of the department gathered in the George Porter Building for a family-friendly day of talks, interactive demonstrations, and hands-on activities that showcased a century of achievement and looked ahead to chemistry's future. At the centre of the day was alumnus Professor Peter W. Atkins (BSc Chemistry, Leicester, 1961), the world-renowned physical chemist and author whose textbooks have educated generations of students. His keynote lecture drew a capacity audience and was the highlight of a programme that blended history, science, and lively discussion.

Why chemistry matters to parliament

The Leicester celebration was more than nostalgia. It highlighted a pressing national issue: chemistry is central to the UK's future, yet university departments are under growing pressure. Imagine, for a moment, a world without cleaning products and sanitation, a world without healthcare, drugs, without smart-phones, fuels, transport and batteries. This would be your world without chemistry!

Chemistry is not simply another academic discipline – it is the enabling science that underpins progress in energy, climate, health, materials, and technology. The Royal Society of Chemistry's Future Workforce and Educational Pathways report (2024) projects that chemistry-related jobs will grow by 6.5% in the next decade, around 30% faster than the average for the UK workforce. These

skills are needed not only in pharmaceuticals, energy, and manufacturing, but also in emerging sectors such as diagnostics, clean technologies, and advanced materials.

Yet universities across the UK are struggling financially, and chemistry departments are closing. The risk is clear: the emergence of "chemistry deserts" in some regions, leaving local businesses without access to the skilled graduates they need. As Jonathan Oxley of the Confederation of British Industry has argued, this is not simply an academic concern but one with direct implications for local economies, industrial competitiveness, and national resilience.

The policy stakes are therefore high. Chemistry sits at the heart of the UK's government priorities, from securing energy independence, to delivering sustainable technologies strengthening healthcare innovation or tackling climate change. Chemistry is a discipline that consistently provides the essential innovations and game-changing breakthroughs. Without strong university chemistry departments to sustain the skills pipeline and research base, the UK will be poorly placed to meet these challenges.

From a living memorial to a scientific powerhouse

The University of Leicester was founded in 1921 as a living memorial to those who had fallen in the First World War, supported by donations from the people of Leicester. Our motto, Ut vitam habeant ("so that they may have life"), continues to shape our mission.



Professor Karl S Ryder Professor of Physical Chemistry, University of Leicester



Dr Alexander (Sandy) Kilpatrick Lecturer in Inorganic

Lecturer in Inorganic Chemistry, University of Leicester

Chemistry arrived four years later, in 1925, when Dr Louis Hunter converted parts of the Fielding Johnson Building into makeshift laboratories. Despite limited facilities, enthusiasm for chemistry was strong: over 100 students applied in those early years. The first graduates included pioneering women such as Florence Marjorie Elkins, who completed her degree in 1934 and went on to postgraduate work, and the School appointed its first women lecturers, Dr Florence Shaw and Dr Brenda Prestt, shortly after the Second World War.

From these modest beginnings, Leicester Chemistry grew into a department known internationally for innovation. The 1960s and 70s brought world-class research in fluorine chemistry and gasphase spectroscopy. The 1980s and 90s saw advances in materials science, catalysis, and electrochemistry. More recently, Leicester has been a hub for sustainable synthesis, green technologies, molecular diagnostics, and atmospheric chemistry.

Science that matters

One theme that runs throughout the century is the ability of Leicester chemists to apply their science in unexpected and impactful ways.

Diagnostics: spin-out companies such as MIP Diagnostics (now Tozaro) design molecularly imprinted polymers that can act as synthetic antibodies, with applications from healthcare to food safety.

Green batteries: ultrasound and even vegetable oil are being explored as tools to recycle and reuse lithium-ion batteries.

Science in Parliament | Vol 81 No 3 | Autumn 2025 1



CHEMISTRY at LEICESTER (from SCIENCE in PARLIAMENT) (ii)









Celebrating 100 years of chemistry at Leicester, from founding graduates, through famous alumni, to chemists of the future (From left to right: Professor Peter W Atkins; Professor Alison Thompson; Dr Richard Blackburn and son, Rony; Marjorie Elkins ca. 1934)

Climate and health: Professor Paul Monks, once head of College (science and engineering) at Leicester, is now the UK Government's Chief Scientific Adviser at the Department for Energy Security and Net Zero, a clear example of Leicester chemistry directly influencing policy.

Forensics: researchers here developed methods to reveal fingerprints on bullet casings, a breakthrough recognised in Time Magazine's "Best Inventions" list.

Chemistry here has never been confined to the laboratory bench. It reaches into forensic science, archaeology, space research, healthcare, and climate solutions - demonstrating again and again that chemistry underpins progress across science, industry, and society.

The Centenary Event: a day of science and storytelling

The Centenary Event in May 2025 brought together multiple generations of Leicester chemists. Visitors toured laboratories, explored hands-on experiments, and saw how chemistry has evolved across the decades.

The keynote lecture by Peter Atkins was both dramatic and deeply personal. He spoke candidly about how "Leicester lifted me out of the gutter." As a teenager, his A-level grades had not been strong enough for his first-choice universities, and he described feeling like a reject. Yet Leicester gave him a chance. which proved transformational. He stayed on after his BSc to complete a PhD in electron spin resonance spectroscopy (1964), then went Stateside as a postdoctoral researcher at UCLA. On his return to the UK, he joined Lincoln College, Oxford, eventually becoming Professor of Chemistry in 1996 and remaining at Oxford until his retirement in 2007. Since then, he has worked as a

full-time author, his chemistry texts becoming the standard works worldwide. For the audience, his story was more than autobiography: it embodied the role of STEM education in social mobility – how a second chance at university entry can unlock global impact. The theme of providing opportunity for our students in the face of adversity remains at the very core of our ethos.

Among the other highlights was the Science Kitchen, led by Great British Bake Off finalist Dr Josh Smalley. In collaboration with the University, his project blends culinary creativity with scientific exploration. Through demonstrations that merge beakers and baking, the Science Kitchen aims to inspire young minds to see science and cooking in a new light – showing that chemistry is both accessible and fun.

Talks throughout the day spanned subjects from climate change to catalysis, from forensic science to pharmaceuticals. Alumni swapped stories of their student days, while current students showcased their own research.

A fund for the future

One of the most tangible legacies of the Centenary has been the launch of the Chemistry Centenary Fund, which has already raised over £10,000 through alumni and supporter donations. These funds will support undergraduate prizes and summer research placements for students from all backgrounds, with a particular focus on widening inclusion and participation.

This initiative builds on Leicester's PolyMErise Project, a three-year pilot funded by the Royal Society of Chemistry's Missing Elements scheme. The Missing Elements report revealed a stark issue: while undergraduate chemistry cohorts in the UK are highly diverse, this diversity declines steeply through postgraduate and academic stages. The result is a loss of talent that the discipline (and society) cannot afford.

Leicester, as one of the UK's most ethnically and socially diverse cities, is uniquely placed to respond. PolyMErise provides ring-fenced funding for paid undergraduate research placements, giving students valuable experience to compete for top careers in academia and industry. The aim is simple but vital: to turn the abundance of raw talent in Leicester into the next generation of chemistry leaders.

Looking ahead

As Leicester Chemistry looks to its second century, its priorities remain as bold as ever:

- Advancing sustainable synthesis and catalysis for a low-carbon future
- Developing new materials for energy storage and clean technologies
- Innovating at the interface of chemistry and life sciences to improve healthcare
- Continuing to inspire the next generation through education and outreach.

The Centenary celebrations made one thing clear: chemistry is not a niche subject, but a central pillar of science and society. It is the discipline that explains the material world, that fuels innovation, and that equips students with logical, quantitative skills prized across the economy.

For Leicester, chemistry has always been about more than atoms and molecules. It is about discovery, opportunity, and the ability of science to change lives - in Leicester, across the UK, and around the world.

Science in Parliament | Vol 81 No 3 | Autumn 2025 2

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SOUTHERN BRANCH



Coatings on Air,
A Visit to the
Hovercraft Museum,
Lee-on-the-Solent
Hampshire, UK.
- C Arnold

Trivalent Chrome (Cr III) Electroplating Trials and Experience – P Alexander

Additive Manufacturing



EXHIBITIONS









ADVANCED ENGINEERING

29 & 30 October 2025 NEC Birmingham, UK

