CHEMWATCH

# BULLETIN

Week of 1 May 2026

GOSSIP | CURIOSITIES | REACH UPDATE | REGULATORY UPDATE | HAZARD ALERT | JANET'S CORNER

# CONTENTS

## GOSSIP

This common plant could clean microplastics from your drinking water

Scientists turn CO2 into fuel using breakthrough single-atom catalyst

Researchers develop highly efficient, durable catalyst for chlor-alkali electrolysis

Stringent regulations on dichloromethane are forcing US labs to rethink use of common solvent

Production EV packing sub-zero-operation sodium-ion batteries on its way

The Ozone Layer Is Healing, But There's a Hidden Catch

Fatal incident at US catalyst refiner under investigation

Nanotextured coating material shreds viruses on contact

New catalyst makes plastic upcycling 10x more efficient than platinum

Scientists discover enzyme that could supercharge Ozempic

## CURIOSITIES

A 2,200-year-old ship's life, charted from pollen and pitch

Scientists just uncovered a 3 million-year climate mystery in Antarctic ice

A forgotten drug is giving new hope to kids with a rare disease

Giant octopuses may have ruled the oceans 100 million years ago

Analysis of Roman shipwreck's coatings tells story of its time on the seas

Vanadium's promise in medicine and the researchers who refuse to give up

Scientists Finally Solved One of Water's Biggest Mysteries

Major Review Finds Alzheimer's Amyloid Drugs Offer No Real Benefit

Hidden virus in your gut may be linked to colon cancer

'Quite Tiny' experiment reveals how RNA jump-started complex life on Earth

## REACH UPDATE

ECHA updates OECD eChemPortal with its latest data

Getting to know the new Chesar Platform

## REGULATORY UPDATE

### ASIA PACIFIC

Norfolk Island PFAS monitoring and management

### AMERICA

CBI Claim Expiration

With national PFAS standards in flux, New Hampshire regulators try to move forward

What's in the Water? EPA Signals Direction of Future Drinking Water Regulations

EUROPE

Largest-ever ban on toxic chemicals in EU hit by 'extremely frustrating' delays

National registry for radiation workers: guidance

INTERNATIONAL

Chemical content validation of recycled plastics - Report

Expression of Interest: Participation in the Global Interlaboratory Assessment 2026

ILO and China sign an agreement on Occupational Safety and Health under the Global Development Initiative

HAZARD ALERT

Malathion

JANET'S CORNER

Who Am I?

# GOSSIP

## This common plant could clean microplastics from your drinking water

Science Daily · 22 Dec 2026

Researchers at the Institute of Science and Technology of São Paulo State University (ICT-UNESP) in São José dos Campos, Brazil, have found that Moringa oleifera , commonly known as moringa or white acacia, could help remove microplastics from water.

The findings were published in ACS Omega , a journal of the American Chemical Society.

Moringa is native to India and grows well in many tropical regions. Its leaves and seeds are widely consumed as food due to their nutritional value. Scientists have also been exploring the seeds for years because of their potential role in water purification.

Moringa Seed Extract Performs Like Chemical Treatment

"We showed that the saline extract from the seeds performs similarly to aluminum sulfate, which is used in treatment plants to coagulate water containing microplastics. In more alkaline waters, it performed even better than the chemical product," says Gabrielle Batista, the first author of the study. She carried out the research during her master's degree in the Post-Graduate Program in Civil and Environmental Engineering (PPGECA) at the Bauru School of Engineering (FEB) at UNESP.

The study was led by Adriano Gonçalves dos Reis, a professor at ICT-UNESP and in the PPGECA at FEB-UNESP. He also heads the project "Direct and In-Line Filtration for the Removal of Microplastics from Drinking Water," which is funded by FAPESP.

"The only drawback found so far regarding aluminum sulfate was the increase in dissolved organic matter, the removal of which could make the process more expensive. However, on a small scale, such as on rural properties and in small communities, the method could be used cost-effectively and efficiently," says Reis.

How Coagulation Helps Remove Microplastics

The research focused on in-line filtration, a method in which water is first treated with a coagulant and then passed through a sand filter. This approach works best for water with low turbidity, meaning it is relatively clear and requires fewer preliminary treatment steps.

Coagulation plays a key role because microplastics and other contaminants carry a negative electrical charge. This causes them to repel each other and prevents them from being captured easily during filtration. Coagulants, including moringa salt extract (which can be made at home) and aluminum sulfate, neutralize these charges. As a result, the particles stick together, forming larger clusters that can be removed more easily.

Earlier work by the same research group showed that moringa seeds are effective throughout a full treatment cycle,...

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## Scientists turn CO2 into fuel using breakthrough single-atom catalyst

Science Daily · 17 Apr 2026

Every chemical reaction must overcome an energy hurdle before it can occur. Substances need an initial input of energy to start reacting. Sometimes this barrier is small, like lighting a match. In many industrial processes, however, the required energy is much higher, which increases costs.

To make reactions easier and more efficient, chemists rely on substances called catalysts. These "reaction helpers" reduce the energy needed. The most effective catalysts often contain metals, including rare and expensive ones.

Breakthrough Catalyst Turns CO 2 Into Methanol

Researchers at ETH Zurich have now made a major advance in catalyst design. Their new system significantly lowers the energy needed to produce methanol (an alcohol) from carbon dioxide and hydrogen.

The team also achieved an unusually efficient use of the metal indium. In this catalyst, each individual indium atom acts as its own active site. This is a major shift from traditional approaches, where metals are grouped in particles.

Another key advantage is improved precision. In the past, catalyst development often relied on trial and error. This new design allows scientists to better observe and understand the reactions happening on the surface, opening the door to more deliberate and optimized catalyst development.

"Methanol is a universal precursor for the production of a wide range of chemicals and materials, such as plastics -- the Swiss army knife of chemistry, so to speak," says Javier Pérez-Ramírez, Professor of Catalysis Engineering at ETH Zurich.

Methanol is essential for producing fuels and materials, and it plays a growing role in efforts to move away from fossil fuels. If the hydrogen and energy used in the process come from renewable sources, methanol production could become climate neutral.

This approach also offers a new way to use CO 2 . Instead of releasing it into the atmosphere, it can be captured and turned into a valuable raw material.

Single Atom Catalysts Maximize Efficiency

"Our new catalyst has a single atom architecture, in which isolated active metal atoms are anchored on the surface of a specially developed support material," Pérez-Ramírez explains.

In conventional catalysts, metals are typically grouped into small particles that can contain hundreds or even thousands of atoms. Many of those atoms are not directly involved in the reaction, making the process less efficient.

Single atom catalysts represent a more efficient alternative. By using metals at the level of individual atoms, scientists can make better use of scarce and costly...

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## Researchers develop highly efficient, durable catalyst for chlor-alkali electrolysis

Phys Org · 29 Apr 2026

by Hefei Institutes of Physical Science, Chinese Academy of Sciences

Efficient and durable catalysts for the chlorine evolution reaction (CER) are critical for chlor-alkali and related brine electrolysis processes, but conventional anodic materials often struggle to balance catalytic activity, selectivity, cost, and stability under harsh operating conditions. Now, a research team led by Prof. Yin Huajie from the Institute of Solid State Physics, Hefei Institutes of Physical Science, Chinese Academy of Sciences, has developed a high-performance chlor-alkali electrode catalyst that combines outstanding activity with long-term stability. The study is published in Nature Communications .

To address these challenges, the team carried out systematic investigations into catalyst design, active-site regulation, and reaction mechanisms. Building on this approach, they developed a new catalyst by introducing atomically dispersed cerium (Ce) into spinel Co 3 O 4 with a three-dimensionally ordered macroporous structure 3D Ce–Co 3 O 4 .

Structural characterization revealed that Ce atoms occupy octahedral Co sites, inducing local structural distortion and generating undercoordinated Co-active centers capable of directly adsorbing Cl - ions. Further in situ characterization and density functional theory calculations showed that Ce doping shifts the active site from an oxygen-centered to a Co-centered configuration, optimizing Cl - adsorption, enhancing catalytic activity, and effectively suppressing lattice-oxygen corrosion.

Electrochemical tests demonstrated that in an acidic NaCl electrolyte , the catalyst delivers excellent performance, requiring only a very low overpotential to drive the chlorine evolution reaction with near-perfect selectivity. Under conditions simulating industrial chlor-alkali electrolysis, it maintained stable operation for an extended period at a high industrial-level current density.

These results highlight the strong potential of 3D Ce–Co 3 O 4 for chlor-alkali electrolysis , offering a promising strategy for developing efficient and durable non-noble-metal CER catalysts.

Zhixian Mao et al, Cerium driven active site relocation in spinel Co3O4 enables stable chlorine evolution in acidic media, Nature Communications (2026). DOI: 10.1038/s41467-026-70443-x

Provided by Hefei Institutes of Physical Science, Chinese Academy of Sciences

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## Stringent regulations on dichloromethane are forcing US labs to rethink use of common solvent

Chemistry World · 29 Apr 2026

Dichloromethane was once a common solvent in labs across the US, but new rules means that some labs are now avoiding it

The US Environmental Protection Agency's (EPA) broad ban on most industrial and commercial uses of dichloromethane (DCM) that has just come into force means more work and expense for many university chemistry departments.

DCM, also known as methylene chloride, is a solvent widely used in academic organic chemistry labs that was also commonly used as degreaser and paint stripper in the US. Exposure to the chemical was linked to dozens of deaths in the country between 1980 and 2024 , primarily related to consumer and professional paint and coating removal. The EPA notes that DCM is neurotoxic and can cause heart and liver damage, as well as various cancers .

Two years ago, President Biden's EPA finalised a ban on most remaining uses of DCM in the country. Last year, some in the research community were surprised when Trump's EPA backed the rule .

DCM is often used as a solvent in chromatography and as a reaction medium, due to its polarity, low boiling point and low flammability. These uses of the chemical are exempt under the new EPA ban, but the workplace requirements now in place are so onerous that many labs may choose to substitute the solvent altogether.

Federal and non-federal laboratories in the US, including many university and private research facilities, will have to put in place initial DCM exposure monitoring by 9 November 2026. And they must ensure that they are meeting the EPA's new exposure limit of 2ppm over eight hours by 8 February 2027. That new standard appears to supersede the significantly laxer limit of 25ppm that the Occupational Safety and Health Administration (Osha) has had in place for almost three decades.

The EPA is also specifying a DCM 'action' level of above 1ppm that will force employers to implement controls that will lower worker exposure and conduct further evaluation. If that action level is surpassed, which compares to 12.5ppm under the existing Osha rules, then monitoring must be repeated every six months. If the action level of 1ppm is not breached labs can monitor once every five years, provided there are no equipment or process changes.

'It's not as if there wasn't already some oversight and guidelines around the use of DCM as a laboratory chemical,' explains Robert Clark , director...

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## Production EV packing sub-zero-operation sodium-ion batteries on its way

New Atlas · 28 Apr 2026

Chinese battery giant CATL and automaker Changan announced the launch of the Changan Nevo A06, the world's first mass-production electric vehicle (EV) powered by sodium-ion batteries. It's due to hit the market mid-2026, and it marks the moment a technology long trapped in the lab finally steps onto the road.

The heart of the car is CATL's Naxtra cell, the result of a decade of R&D and roughly 10 billion yuan (US$1.4 billion) in investment. It's reported to reach an energy density of 175 Wh/kg – the highest achieved in mass production for sodium chemistry according to the company – and delivers a range of over 400 km (249 miles), with CATL targeting 500–600 km (310–373 miles) in future iterations.

Sodium still lags slightly behind lithium iron phosphate (LFP) , the dominant chemistry in the global EV market, on energy density. But the Naxtra wasn't built to win that race. Where it pulls ahead is in extreme conditions. CATL claims that at –30 °C (–22 °F), the Naxtra delivers nearly triple the discharge power of a comparable LFP pack. At –40 °C (–40 °F), it retains over 90% of its capacity,

and it keeps functioning even at –50 °C (–58 °F). In crush, puncture, and saw tests, the battery produced no smoke or flames – a safety profile that's hard to ignore.

The Nevo A06 (also marketed as the Qiyuan A06) is Changan's first compact electric sedan, measuring 4,720 mm (15.5 ft) in length with a 2,750 mm (9 ft) wheelbase. It has been on sale since November 2025 in a lithium-ion plug-in hybrid (PHEV) version, offering a pure electric range of 136 km (85 miles) and a combined range of 1,160 km (721 miles). The upcoming sodium-ion Naxtra variant features a completely different pure-electric configuration. While it is due to arrive in China in the coming months, full specifications and international availability have yet to be announced.

CATL says it has cleared the manufacturing hurdles needed to scale sodium production to the gigawatt-hour level, the same threshold as a modern lithium gigafactory. The company's roadmap, announced at its supplier conference in December 2025, laid out four deployment areas for 2026: battery swapping, passenger vehicles, commercial vehicles, and energy storage. So far, it's tracking on schedule, which is not something the battery industry can often claim.

CATL began its sodium-ion research in 2016. In 2021 the company unveiled a first-generation...

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## The Ozone Layer Is Healing, But There’s a Hidden Catch

Sci Tech Daily · 29 Apr 2026

The Montreal Protocol, signed in 1987, is widely considered one of the most effective environmental agreements ever implemented. It has driven a global phaseout of chemicals that once damaged the ozone layer and increased risks such as skin cancer and other health problems.

Follow-up research led by MIT has shown that reducing these ozone-depleting substances is helping the ozone layer slowly rebuild . (It could return to 1980 levels by as early as 2040, according to some estimates.) However, the agreement includes an exception. Certain ozone-depleting chemicals are still allowed as feedstocks for manufacturing other materials. This exemption was based on the belief that only a very small fraction, about 0.5 percent, would escape into the atmosphere.

Recent measurements suggest that assumption no longer holds. Scientists have detected higher levels of ozone-depleting substances in the atmosphere than expected, prompting a reassessment of how much is leaking from feedstock use.

A new study by an international team that includes MIT researchers examines how these higher leakage rates affect the ozone layer’s recovery. Their results indicate that if current emissions continue, the return of the ozone layer could be delayed by roughly seven years.

“We’ve realized in the last few years that these feedstock chemicals are a bug in the system,” says author Susan Solomon, the Lee and Geraldine Martin Professor of Environmental Studies and Chemistry, who helped identify the original cause of the ozone hole. “Production of ozone-depleting substances has pretty much ceased around the world except for this one use, which is when you have a chemical you convert into something else.”

The research, published in Nature Communications , is the first to fully quantify the effect of emissions from feedstocks. These substances are widely used to produce plastics, nonstick coatings, and replacement chemicals for those already restricted under the Montreal Protocol.

According to the researchers, limiting both the use of these feedstocks and the amount that escapes into the atmosphere will be increasingly important, especially as demand for products like plastics continues to rise.

“We’ve gotten to the point where, if we want the protocol to be as successful in the future as it has been in the past, the parties really need to think about how to tighten up the emissions of these industrial processes,” says first author Stefan Reimann of the Swiss Federal Laboratories for Materials Science and Technology.

“To me, it’s only fair, because so many...

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## Fatal incident at US catalyst refiner under investigation

Chemistry World · 28 Apr 2026

Two workers were killed and 21 others hospitalised in an incident at Ames Goldsmith Catalyst Refiners, a silver recovery and catalyst manufacturing facility in West Virginia, US, on 22 April. The incident is now under investigation by the US Chemical Safety and Hazard Investigation Board (CSB).

Initial investigations relayed by local officials suggest the victims died from exposure to hydrogen sulfide released when nitric acid mixed with a tank cleaning agent

Initial information indicates that a chemical reaction occurred during cleaning and decommissioning of equipment at the Catalyst Refiners facility, which reclaims silver and reprocesses ethylene oxide catalysts. Nitric acid and a proprietary cleaning agent, M2000A , were reportedly mixed during decommissioning of a tank. This released toxic hydrogen sulfide gas in a building where numerous employees were present, according to CSB. Overall, the CSB said more than 30 people sought medical care due to the incident.

West Virginia governor Patrick Morrisey said that the state Department of Environmental Protection (DEP) is implementing a comprehensive air monitoring plan in coordination with the federal US Environmental Protection Agency (EPA). These air tests will be conducted at the facility and in surrounding areas.

Meanwhile, an investigation by the DEP’s environmental enforcement teams will examine the cause as well as the facility’s overall compliance with state and federal regulations. Officials are closely monitoring the site’s wastewater handling and any potential runoff to ensure there are no impacts to surrounding systems.

The CSB is an independent federal agency charged with investigating industrial chemical incidents and developing recommendations to prevent their recurrence. The agency does not issue citations or fines but makes safety recommendations to companies, industry organisations, labour groups, and regulatory agencies like the EPA and the Occupational Safety and Health Administration.

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## Nanotextured coating material shreds viruses on contact

New Atlas · 27 Apr 2026

It doesn't take much to pick up a viral infection in spaces we share with other people – whether it's from tiny droplets in the air containing these particles, or touching doorknobs and countertops in offices and hospitals.

A material science breakthrough might help mitigate that using prickly spikes so small, you can't even see them.

Researchers at Australia's RMIT University have developed a nanostructured surface fabricated from silicon that's textured with ultra-fine nanopillars.

The antireflective material itself appears black to the naked eye, and the nanopillars have pointy ends that are so sharp, they pierce through the envelope of viral particles.

Once they're ripped open this way, the virus' infectivity is almost entirely eliminated over the course of six hours. That means that if we can coat high-touch surfaces with this material, we can greatly reduce the chance of spreading disease in shared spaces.

To test the effectiveness of this material, researchers placed droplets of human parainfluenza virus type 3 (hPIV-3), a common respiratory virus, onto silicon surfaces covered in millions of microscopic, sharp spikes and compared them to smooth, flat silicon surfaces for up to six hours.

Using powerful microscopes and laboratory tests to check for remaining infection, the team observed how the viruses interacted with these different textures. The experiment revealed that the tiny spikes acted like needles, physically puncturing the virus's fatty outer protective membrane, which caused the viral particles to deflate and lose their structural integrity.

While the viruses on the smooth surface remained largely intact and dangerous, the spiky surface destroyed 96% of the infectious virus within the six-hour window, demonstrating that this mechanical "nanospike" design can effectively kill pathogens without the need for toxic chemicals.

According to the researchers, who've looked at previous research into nanotextured materials, this could also destroy a host of other viruses like SARS-CoV-2, respiratory syncytial virus (RSV), rhinovirus (RV), and human coronavirus NL63 – though it's yet to be tested specifically against them. The material also proved to be effective at killing off certain bacteria in the same way, to an extent. We saw something similar with bactericidal stainless steel a couple of years ago.

The findings could pave the way for the development of new materials and surface coatings that can make a wide range of everyday objects safer to use.

"We could one day have surfaces like phone screens, keyboards and hospital tables covered with this...

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## New catalyst makes plastic upcycling 10x more efficient than platinum

Science Daily · 28 Mar 2026

Many common products, including plastics and detergents, rely on chemical reactions that depend on catalysts made from precious metals such as platinum. These metals are effective but costly and limited in supply. For years, scientists have been searching for alternatives that are cheaper and

more sustainable. One promising option is tungsten carbide, an Earth-abundant material already widely used in industrial machinery, cutting tools, and chisels.

Despite its potential, tungsten carbide has not been easy to use as a catalyst. Its chemical behavior can be unpredictable, which has restricted its broader adoption. Researchers led by Marc Porosoff, an associate professor in the University of Rochester's Department of Chemical and Sustainability Engineering, have now made important progress that could allow tungsten carbide to compete with platinum in key chemical reactions.

According to Sinhara Perera, a chemical engineering PhD student in Porosoff's lab, one of the main challenges lies in how tungsten carbide atoms arrange themselves.

Tungsten carbide's atoms can form many different configurations, known as phases, says Perera. These phases can strongly influence how well the material performs as a catalyst.

"There's been no clear understanding of the surface structure of tungsten carbide because it's really difficult to measure the catalytic surface inside the chambers where these chemical reactions take place," she says.

To address this problem, the research team designed a method to precisely control the structure of tungsten carbide during active reactions. In a study published in ACS Catalysis , Porosoff, Perera, and chemical engineering undergraduate student Eva Ciuffetelli '27 manipulated tungsten carbide particles at the nanoscale inside chemical reactors that operate at temperatures above 700 degrees Celsius.

Using a technique called temperature-programmed carburization, the researchers created tungsten carbide catalysts in specific phases directly inside the reactor. They then ran chemical reactions and analyzed which versions delivered the strongest performance.

"Some of the phases are more thermodynamically stable, so that's where the catalyst inherently wants to end up," says Porosoff. "But other phases that are less thermodynamically stable are more effective as catalysts."

The team identified one phase in particular, β-W2C, that showed exceptional performance in reactions that convert carbon dioxide into key building blocks for fuels and useful chemicals. With additional optimization by industry, the researchers believe this form of tungsten carbide could match platinum's effectiveness without its high price or supply limitations.

Beyond carbon dioxide conversion, Porosoff and his collaborators have also explored tungsten carbide as a catalyst...

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## Scientists discover enzyme that could supercharge Ozempic

Science Daily · 12 Apr 2026

Researchers at the University of Utah have identified an enzyme called PapB that can reshape therapeutic peptides, a class of protein-like drugs, by linking their ends together into tight rings. This process, known as macrocyclization, creates compact structures that can improve how these medicines perform in the body.

The discovery could be especially useful for enhancing GLP-1 medications such as semaglutide, the active ingredient in Ozempic and Wegovy, which are widely used to treat diabetes and obesity. By converting these drugs into ring-shaped forms, scientists may be able to make them more durable and effective.

Why Cyclic Peptides Matter for Drug Performance

Ring-shaped peptides offer several advantages over their open-chain counterparts. According to co-author Karsten Eastman, a research associate in the university's Department of Chemistry and CEO and co-founder of Sethera Therapeutics, these structures are more stable, remain active longer, and can better interact with their biological targets.

"Peptides themselves can be extremely difficult to work with because they have a lot of reactive chemical handles. But this is what makes them so great in biology. You can get the type of reaction that you want in the body, but it's difficult to modify them in hyper-specific ways," said Eastman, who completed his Ph.D. in 2023 in the lab of Utah chemistry professor Vahe Bandarian. "What we show in the study is an enzymatic method -- using a tiny molecular machine to modify or hyper modify peptides in extremely controlled ways -- enabling what we believe will be next generation peptide therapeutics."

Eastman and Bandarian co-founded Sethera last year to bring their discoveries toward real-world applications, supported by funding from the National Institutes of Health. Their work was recently recognized by the university's Technology Licensing Office, which named them 2025 Founders of the Year for developing the PolyMacrocyclic Peptide (pMCP) Discovery Platform.

A Simpler Alternative to Traditional Chemical Methods

Closing peptide chains into rings has traditionally required complex and costly chemical techniques, especially when attempted late in drug development. PapB provides a cleaner and more efficient approach. The enzyme forms a precise bond that links the ends of a peptide without needing extra "leader" sequences, which are typically required for enzymes to recognize their targets.

In the study, published in ACS Bio & Med Chem Au , the team used PapB, a "radical SAM" (S-adenosyl-L-methionine) enzyme, to connect the ends of GLP-1-like peptides. The linkage forms a sulfur-carbon bond called...

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# CURIOSITIES

## A 2,200-year-old ship's life, charted from pollen and pitch

refractor.io · 28 Apr 2026

An ancient Roman ship was repaired multiple times, with multiple techniques, and in multiple places around the Adriatic Sea before it sank, a new study suggests. The findings highlight the expansive nature of trade and technical transfer in the Roman Republic.

The Ilovik-Paržine 1 shipwreck was discovered in 2016 in the Adriatic Sea, off the western coast of Croatia. It was a wooden sailing ship likely intended for maritime trade and transport around the Sea. When it sank nearly 2,200 years ago, it was carrying timber and amphoras that were likely full of wine.

Those goods — and the ship itself — have been much studied since the discovery. But in a new study published this month in Frontiers in Materials , a team of researchers examined, for the first time, the various layers of waterproof coating applied to the ship.

“Non-wood organic materials from shipwrecks have been largely under-analyzed,” Dr. Armelle Charrié, an archaeometrist at the University of Strasbourg and the chemist of the study, told Refractor. “On the Ilovik-Paržine 1 shipwreck, the waterproofing coatings are in the form of a brown, powdery block. Their aesthetic appearance is of no interest, unlike a piece of the hull or a fragment of an amphora. Yet they are part of the heritage materials, and their study potentially rich in information.”

The team examined 10 waterproofing samples from various parts of the ship. From these, they were able to distinguish approximately four or five separate applications of waterproof coating, possibly reflecting successive repairs over its lifetime.

Using these samples, the researchers were then able to reconstruct the environments where each separate coat of waterproofing was applied, and point to a possible journey of the ship throughout the Adriatic. How? Ancient pollen, trapped and protected in each layer of coating.

“An identified pollen grain is usually linked to a family, and more rarely to a genus or even a species,” Dr. Quentin Couillebault, a researcher in archaeology at Aix-Marseille University and a second author of the study, told us. “The assembly of pollen grains thus allows us to reconstruct a landscape.”

Pollen collected from each of the waterproof coating samples reflected a “high diversity” of environments. Upon comparing them to pollen samples from known places around the Adriatic, the researchers were able to establish four “distinct clusters” of environments: a forest of holly oak and primroses, a terrain dominated by juniper and heath,...

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## Scientists just uncovered a 3 million-year climate mystery in Antarctic ice

Science Daily · 29 Jan 2026

Scientists studying ancient Antarctic ice are uncovering new details about how Earth's climate has changed over the past 3 million years. By analyzing both the ice and the tiny pockets of air trapped inside it, researchers are building a longer and more complete record of past climate conditions.

Two new studies published in the journal Nature reveal a surprising pattern. While the planet gradually cooled over this time, levels of heat-trapping greenhouse gases in the atmosphere declined only slightly.

For more than a century, scientists have known that Earth was significantly warmer about 3 million years ago. Evidence includes fossils of temperate and subtropical forests found in places like Alaska and Greenland, as well as ancient shorelines along the U.S. East Coast from Georgia to Virginia, showing that sea levels were much higher.

However, the reason behind this warm period and the cooling that followed has remained unclear. One major challenge has been the difficulty of accurately reconstructing both global temperatures and greenhouse gas levels from so far back in time.

Searching for the Oldest Ice in Antarctica

The new research comes from the National Science Foundation Center for Oldest Ice Exploration, known as COLDEX, a collaborative effort led by Oregon State University. The team focuses on locating and analyzing some of the oldest ice on Earth.

The studies were led by Julia Marks-Peterson, a doctoral student at OSU, and Sarah Shackleton, who conducted the work as a postdoctoral researcher at Princeton University and is now a professor at Woods Hole Oceanographic Institution. They examined ancient ice recovered from Allan Hills, a unique region along the edge of the East Antarctic ice sheet.

Unlike typical ice core sites, Allan Hills contains ice that has been pushed up and distorted by movement within the ice sheet. This disrupts the original layering, so instead of a continuous timeline, researchers get "snapshots" of climate conditions from different points in the past.

"Those snapshots extend climate records from ice much further than previously possible," said COLDEX Director Ed Brook, a paleoclimatologist in OSU's College of Earth, Ocean, and Atmospheric Sciences. "These longer records are also now raising new questions about Earth's climate evolution and how far back in time we might be able to go with ice core data."

One study used measurements of noble gases preserved in the trapped air bubbles to estimate changes in ocean temperature over time. These gases provide a...

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## A forgotten drug is giving new hope to kids with a rare disease

Science Daily · 31 Mar 2026

A medication that has been around for decades and used to treat several conditions, including a chronic parasitic infection, is now emerging as a potential option for patients with a different and far rarer disease. Early findings suggest the drug could help people with Bachmann-Bupp syndrome (BABS), a life-threatening genetic disorder that affects only a small number of individuals worldwide.

This progress is being driven by a new collaboration between Corewell Health, Michigan State University, and Every Cure, a nonprofit biotech group focused on finding new uses for existing drugs.

"Beyond helping us build preclinical studies and retrospective analyses, the team at Every Cure has already begun helping us navigate regulatory pathways and compliance on so many levels in the hopes that we can treat more of our BABS patients," said Caleb Bupp, M.D., pediatric geneticist for Corewell Health Helen DeVos Children's Hospital in Grand Rapids, Michigan. "They are opening doors that we never would have been able to crack open. It's a hopeful and exciting time for all of us and more importantly, our patients."

The drug, called difluoromethylornithine, also known as DFMO or eflornithine, has a long history in medicine. It has been used to treat West African sleeping sickness, a chronic illness spread by the tsetse fly. It is also used to reduce unwanted facial hair in women and to help prevent neuroblastoma from returning.

Researchers at Corewell Health and Michigan State University College of Human Medicine have now identified another possible use. They found that DFMO may help treat Bachmann-Bupp syndrome and have already administered it to a small number of patients through an FDA-approved, single-patient investigational protocol.

Understanding Bachmann-Bupp Syndrome (BABS)

BABS is caused by gain-of-function mutations in the ornithine decarboxylase, or ODC1 gene. These mutations lead to serious developmental challenges, including significant delays, low muscle tone, and hair loss.

DFMO directly targets this pathway. It works by inhibiting the ODC protein, which in turn reduces the excessive enzyme activity caused by the mutated gene. In the limited number of patients treated so far, this approach has led to improvements in several symptoms.

"I've studied DFMO and its effect on the ODC1 gene for three decades, including its clinical use in pediatric neuroblastoma," said MSU pediatrics professor André Bachmann, Ph.D., who along with Dr. Bupp collaborated to be the first to identify BABS in a patient. "It was a chance encounter with Dr. Bupp that...

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## Giant octopuses may have ruled the oceans 100 million years ago

Science Daily · 15 Apr 2026

Modern octopuses are known for their intelligence and flexibility, slipping through tight spaces, hiding in reefs, or drifting through the deep ocean. However, new research suggests their distant ancestors lived very differently. Scientists now believe that the earliest octopuses were not quiet, elusive creatures but massive predators that hunted at the very top of the marine food chain

alongside large vertebrates. The study, led by researchers at Hokkaido University, was published in Science on April 23, 2026.

Tracing the origins of octopuses has long been difficult because their soft bodies rarely fossilize. Unlike animals with bones or shells, they leave behind very little physical evidence. To overcome this, researchers focused on fossilized jaws, a part of the body more likely to survive over millions of years, to uncover clues about their early evolution.

Using high-resolution grinding tomography along with an artificial intelligence model, the team discovered fossil jaws embedded within rock samples dating from the Late Cretaceous period, between 100 and 72 million years ago. These fossils were recovered from sites in Japan and Vancouver Island, where calm seafloor conditions helped preserve delicate details. Fine wear marks on the jaws provided valuable insight into how these ancient animals fed.

The fossils belonged to an extinct group of finned octopuses known as Cirrata. By studying the size, shape, and surface wear of the jaws, researchers determined that these animals were active hunters capable of crushing hard prey with strong bites.

"Our findings suggest that the earliest octopuses were gigantic predators that occupied the top of the marine food chain in the Cretaceous," says Professor Yasuhiro Iba of Hokkaido University. "Based on exceptionally well-preserved fossil jaws, we show that these animals reached total lengths of up to nearly 20 meters, which may have surpassed the size of large marine reptiles of the same age."

"The most surprising finding perhaps was the extent of wear on the jaws," says Iba. The fossil jaws showed extensive chipping, scratching, cracking, and polishing, all signs of a strong biting force. "In well-grown specimens, up to 10% of the jaw tip relative to the total jaw length had been worn away, which is larger than that seen in modern cephalopods that feed on hard-shelled prey. This indicates repeated, forceful interactions with their prey, revealing an unexpectedly aggressive feeding strategy." These observations point to highly active predators that regularly consumed tough, abundant prey.

This discovery significantly reshapes what...

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## Analysis of Roman shipwreck’s coatings tells story of its time on the seas

Chemistry World · 24 Apr 2026

Chemical analysis of a Roman shipwreck’s coatings reveals that its crew waterproofed the vessel multiple times, using different materials depending on the ship’s location. The researchers behind the work say that the findings provide a better picture of the ship’s history by ‘understanding the techniques used, the phases of its life, its movements, its environment – going far beyond a simple description of the materials’.

The Roman ship – known as Ilovik-Paržine 1 – sank around 2200 years ago in a shallow bay off the coast of what is now Croatia. Archaeologists discovered the wreck in 2016 and have since studied the ship and its cargo extensively. Yet, the researchers say that ‘little interest has been given to non-wooden materials’, including the organic coatings used to waterproof the ship’s exterior.

'There's a long history of coating [ships],' says Armelle Charrié-Duhaut at Strasbourg University, France, who worked on the project. She adds that a ship's coating depends on the materials available in each region, meaning that 'each boat has its own history'.

Charrié-Duhaut's team studied 10 coating samples using infrared spectroscopy and mass spectrometry. The findings suggest that the ship was recoated four or five times during its working life, and also provide evidence of the route that the ship likely sailed.

Most of the coating samples contained high levels of molecules derived from abietic acid – a diterpene found in pine trees. This suggests that the crew coated the ship with pitch, a substance made by heating coniferous tree resin.

However, one of the samples also contained long-chain wax esters that are commonly found in beeswax. Charrié-Duhaut explains that adding beeswax would improve a coating's hydrophobicity and reduce its viscosity, making it easier to apply.

The team also analysed pollen trapped within the coatings, finding samples that came from plants found at various regions of the Adriatic coast.

Several of the coatings contained pollen samples native to plants found near to where the ship was made in Brundisium (now Brindisi) on Italy's south-eastern coast. Other samples indicated plants consistent with those on the north-eastern Adriatic coast, where archaeologists found the shipwreck.

Irena Radić Rossi , a maritime archaeologist at the University of Zadar in Croatia, thinks that the work is 'extremely useful'. She says that it reminds archaeologists that shipwrecks should be studied as a whole. 'You have to study the hull. You have to study the origin of tree...

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## Vanadium's promise in medicine and the researchers who refuse to give up

Chemistry World · 27 Apr 2026

It mimics phosphate, kills cancer cells in the lab and almost changed how we treat diabetes. So why has a vanadium compound never made it to the clinic?

While most chemists will be familiar with vanadium in the context of metallurgy, catalysis and battery technologies, appreciation of its clinical applications is reserved for a much smaller subset of people.

However, the research is there – and has been for some time. There is a small, but very dedicated, pool of scientists spread across the world who see, and have demonstrated, the promise of vanadium-based compounds for treating cancers and parasitic diseases.

Due to their ability to affect signalling pathways, inhibit protein tyrosine phosphatases, enhance and inhibit the formation of reactive oxygen species, and influence metabolism, interest in the medicinal applications of vanadium coordination complexes and vanadium salts has been there for many years.

Initially much of the focus was on type 2 diabetes. There are a few proposed mechanisms but vanadium compounds have been reported to activate Akt signalling, which is central to glucose and

lipid metabolism, and tyrosine phosphorylation by inhibiting protein tyrosine phosphatase 1B, which is involved in the insulin-signalling pathway.

Debbie Crans has spent four decades exploring the chemistry and biology of vanadium. Among the many compounds studied by her group is [VO(Hshed)(dtb)], which they have investigated as a potential anti cancer agent. Laboratory studies show that its bulky, hydrophobic catechol ligand helps the molecule associate with cell membrane like environments, a property that may enhance its biological activity

However, the field has faced endless hurdles along the way that have significantly reduced vanadium's appeal.

One researcher who has always stood by its side, however, is Debbie Crans . Based at Colorado State University in the US, Crans' four decades of interest in the fundamental chemistry and biochemistry of vanadium has earned her the unofficial title of the 'Queen of vanadium'.

She was drawn to the field while working on enzymes that process molecules containing a phosphate and realising the important role that phosphatases plays in biology – 'it's the most important way that you can change signalling in a cell; if you change the ratio of phosphatases to kinases, it can influence if you get cancer or not, whether you cure diabetes or not,' she explains.

It was during this period of fascination with phosphates that she came across two studies , one that showed that...

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## Scientists Finally Solved One of Water's Biggest Mysteries

Sci Tech Daily · 29 Apr 2026

Researchers at Stockholm University have used advanced X-ray laser technology to uncover a long-suspected feature of water: a critical point that appears when water is deeply supercooled, around -63 °C and 1000 atmospheres. This hidden state helps explain why water behaves so unusually under normal conditions. The results have been published in the journal Science.

Water is everywhere and essential for life, yet it behaves very differently from most other liquids. Properties such as density, specific heat, viscosity, and compressibility respond to temperature and pressure in ways that run counter to what scientists see in other substances.

Most materials become denser as they cool. Following that logic, water should be most dense at its freezing point. However, everyday observations show the opposite. Ice floats, meaning it is less dense than liquid water. In fact, water reaches its maximum density at 4 degrees C, which is why it sinks below ice in a glass or in natural bodies of water.

When cooled below 4 degrees, water begins expanding again. If pure water is cooled further below 0 degrees without freezing (a process possible when crystallization is slow), this expansion continues and even accelerates as the temperature drops. Other properties, including compressibility and heat capacity, also become increasingly unusual as the water cools.

To investigate these mysteries, scientists used ultra-fast X-ray pulses at facilities in South Korea, allowing them to observe water before it could freeze. This made it possible to identify the critical point and confirm its role in shaping water's unusual behavior.

"What was special was that we were able to X-ray unimaginably fast before the ice froze and could observe how the liquid-liquid transition vanishes and a new critical state emerges," says Anders Nilsson, Professor of Chemical Physics at the Department of Physics at Stockholm University. "For decades, there have been speculations and different theories to explain these remarkable properties, and one theory has been the existence of a critical point. Now we have found that such a point exists."

Water is unusual because it can exist as two distinct liquid forms under low temperature and high pressure. These forms differ in how their molecules are arranged and bonded. As temperature rises and pressure drops, the distinction between these two liquid states disappears, merging into a single phase at the critical point.

This region is highly unstable, producing fluctuations across a wide range of temperatures and pressures, even reaching...

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## Major Review Finds Alzheimer's Amyloid Drugs Offer No Real Benefit

Sci Tech Daily · 29 Apr 2026

A major review challenges a long-standing strategy in Alzheimer's research, suggesting that removing a hallmark brain protein may not lead to meaningful improvements for patients.

A major new Cochrane review is challenging one of the most influential ideas in Alzheimer's treatment: that clearing amyloid beta from the brain will meaningfully slow the disease.

The review found that anti-amyloid drugs can remove amyloid plaques, but that change does not appear to translate into a noticeable clinical benefit for patients. At the same time, these treatments may increase the risk of brain swelling and bleeding.

Amyloid beta is a protein that builds up in the brains of people with Alzheimer's disease, often before symptoms appear. While this buildup has long been linked to the disease, its exact role in driving progression remains unclear. Many treatments have aimed to remove these proteins, based on the idea that clearing them could slow or prevent cognitive decline.

The review analyzed results from 17 clinical trials involving 20,342 participants. These studies focused on people with mild cognitive impairment or early-stage dementia caused by Alzheimer's disease. Supporters of anti-amyloid therapies have argued that earlier intervention might improve outcomes, before significant damage occurs.

Overall, researchers found that these drugs had little to no impact on cognitive decline or the severity of dementia. Any measured effects were minimal and did not meet accepted standards for a meaningful clinical improvement.

"Unfortunately, the evidence suggests that these drugs make no meaningful difference to patients," says lead author Francesco Nonino, neurologist and epidemiologist at the IRCCS Institute of Neurological Sciences of Bologna, Italy. "There is now a convincing body of evidence converging on the conclusion that there is no clinically meaningful effect. While early trials showed results that were statistically significant, it is important to distinguish between this and clinical relevance. It is common for trials to find statistically significant results that do not translate into a meaningful clinical difference for patients."

The analysis also found an increased risk of brain swelling and bleeding among patients taking these medications. In many cases, these issues were detected through imaging scans and did not produce obvious symptoms. However, the long-term effects remain uncertain because symptom reporting varied across the trials.

Based on the available evidence, the authors conclude that continuing to target amyloid beta is unlikely to produce clear benefits for patients.

Although these treatments can reduce amyloid levels in the brain, this change...

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## Hidden virus in your gut may be linked to colon cancer

Science Daily · 25 Jan 2026

Colorectal cancer is among the most common cancers in Western countries and remains a major cause of cancer-related deaths. While factors like age, diet, and lifestyle are known to influence risk, the exact triggers behind the disease are still not fully understood.

In recent years, scientists have increasingly focused on the gut microbiome, the vast ecosystem of bacteria, viruses, and other microorganisms living in the digestive system.

Now, researchers from the University of Southern Denmark and Odense University Hospital have identified a previously unknown virus inside a common gut bacterium. This virus appears more often in people with colorectal cancer, offering a new clue about how the disease may develop.

A Common Gut Bacterium With a Longstanding Mystery

For years, researchers have linked one specific bacterium, Bacteroides fragilis , to colorectal cancer. However, this connection has been difficult to explain because the same bacterium is also found in most healthy individuals.

"It has been a paradox that we repeatedly find the same bacterium in connection with colorectal cancer, while at the same time it is a completely normal part of the gut in healthy people," says Flemming Damgaard, medical doctor and PhD at the Department of Clinical Microbiology at Odense University Hospital and the University of Southern Denmark.

To resolve this contradiction, the team investigated whether there might be important differences within the bacterium itself.

The key difference turned out to be a virus living inside the bacterium. In patients who later developed colorectal cancer, Bacteroides fragilis was much more likely to carry a specific bacteriophage, a virus that infects bacteria.

"We have discovered a virus that has not previously been described and which appears to be closely linked to the bacteria we find in patients with colorectal cancer," says Flemming Damgaard.

The researchers believe this virus represents entirely new types that have not been identified before.

"It is not just the bacterium itself that seems interesting. It is the bacterium in interaction with the virus it carries," he explains.

Although the study shows a strong statistical link between the virus and colorectal cancer, it does not prove that the virus causes the disease.

"We do not yet know whether the virus is a contributing cause, or whether it is simply a sign that something else in the gut has changed," says Flemming Damgaard.

The discovery began with data from a large Danish population study involving about two million people....

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## 'Quite Tiny' experiment reveals how RNA jump-started complex life on Earth

refractor.io · 27 Apr 2026

It's generally believed that the most complex systems of our world began from very simple things. Then, as a force of survival, evolution began to occur, and things gradually became more complex. This same perspective applies to science's general understanding of the origin of life. The entire complexity of the molecular system, and life as we know it, all began from something very small, and has evolved into the concept of genetics and modern biology.

For a long time, scientists have posited that this simple "thing" from which life began is Ribonucleic acid (RNA), a polymeric molecule that's essential for a wide range of biological functions, including building proteins and regulating genes.

This is because the RNA has a unique capacity to serve as both a template and a catalyst: RNA can make copies of itself in a process called self-replication, and it can also catalyze the reaction of self-replication, thereby aiding itself in making many copies of itself. Sophisticated and powerful at the same time.

While this may explain how a single polymer copied itself into what we now know as the complex genetic system, there are some plot holes in the story. Firstly, most RNA molecules are quite large (about 150 nucleotides long) and structurally complex. And this raises questions: how can a molecule so complex be able to copy itself accurately without any mutations? And more importantly, how did these complex molecules emerge? In addition, these RNAs are often folded, and their folded nature inhibits self-replication. So while the RNA World Hypothesis – the notion that earlier life forms may have used RNA to store genetic material before DNA took over that role – sounds plausible, this hasn't been proven in a lab setting.

In this new study published in Science in February, scientists might just have cracked the code and taken us a step further in finding proof to support the RNA World hypothesis.

"We were interested in seeing if it's possible to build a very simple chemical system that starts replicating itself, mutating, and evolving. The idea is that something like that could be what happened at the origins of life," said Edoardo Gianni, corresponding author on the paper. He explained further that when considering the origin of life, you couldn't have all the complex components of living cells; you need something as simple as possible to get started, and the goal of this research...

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# REACH UPDATE

## ECHA updates OECD eChemPortal with its latest data

ECHA · 20 Apr 2026

ECHA/NR/26/18

The European Chemicals Agency's (ECHA) REACH data, published in ECHA CHEM, its centralised regulatory database, has been updated in the OECD eChemPortal.

20 April 2026 – Since the last data update, about 5 000 existing REACH registrations have been updated, and 1 229 new substances have been registered. Search results in the eChemPortal now link directly to the corresponding source data in ECHA CHEM, improving traceability and access for users worldwide.

The eChemPortal allows users to run property-based searches across all substances as well as searches for individual substances. In addition to ECHA's data, the portal also brings together information from numerous governmental sources worldwide.

Background

The OECD eChemPortal provides free public access to information on the properties of chemicals collected through governmental chemical programmes around the world.

The Organisation for Economic Co-operation and Development (OECD) is responsible for developing and maintaining the eChemPortal. The portal is hosted by the European Chemicals Agency (ECHA).

The data sources accessed through the eChemPortal are maintained by the organisations that create them, which are responsible for keeping links between the portal and their local databases up to date.

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## Getting to know the new Chesar Platform

ECHA · 22 Apr 2026

Are you preparing chemical risk assessments under REACH or biocides legislation? Do you want to understand how the new Chesar Platform can help you? If the answer is yes, this webinar is for you.

In this session, we will introduce the new Chesar Platform and explain how it supports the preparation of chemical risk assessments. Our experts will present the platform's key features and outline the scope covered in this first version. They will show how the platform helps you perform and document chemical safety assessments under REACH, as well as environmental risk assessments for biocides.

What you will gain

Participants will gain an overview of the new Chesar Platform, its main functionalities, and how it supports regulatory processes. You will learn how the new platform is structured, what benefits it brings, and what to consider when starting to use it.

Who should attend

This webinar is intended for:

Registrants, applicants and authorities preparing chemical risk assessments under REACH and biocides

Users of Chesar 3 and EUSES

Consultants and service providers supporting regulatory submissions

Other stakeholders interested in Chesar developments

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# REGULATORY UPDATE

## ASIA PACIFIC

### Norfolk Island PFAS monitoring and management

Australian Government · 23 Apr 2026

The Department of Infrastructure, Transport, Regional Development, Communications, Sport and the Arts continues to monitor and manage per- and poly- fluoroalkyl substances (PFAS) on Norfolk Island related to the historical use of firefighting foam at the airport.

Document

Media Release—Norfolk Island PFAS monitoring and management—23 April 2026—PDF (178.58 KB)

Environmental consultants Senversa returned to island in November 2025 for the fourth round of annual monitoring, collecting samples from 54 sources, including water, soil, sediment and biota.

Overall, the 2025 monitoring showed that PFAS concentrations were generally within the historical range.

The monitoring report is now publicly available on the department's website.

Senversa was first commissioned by the Australian Government to complete a comprehensive PFAS environmental investigation after elevated levels of PFAS were detected within the Mission Creek catchment directly below the aviation fire services training drill ground, adjacent to Norfolk Island International Airport in December 2019. All reports are publicly available on the departmental website.

The department is committed to continuing to work closely with Norfolk Island Regional Council and the community on response actions to manage PFAS risk, which includes the removal of legacy firefighting foam from on island.

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## AMERICA

### CBI Claim Expiration

US EPA · 24 Apr 2026

TSCA section 14(e) (26 USC 2613) limits the duration of most confidential business information (CBI) claims to 10 years from the date of the original submission, unless the submitting company requests and EPA approves an extension. Without an approved extension, EPA may make the claimed

information public without further notice. The first group of CBI claims submitted by companies after the Lautenberg Act was signed into law in 2016 will expire in June 2026 unless requests for extension for those claims are submitted and substantiated within established timeframes.

To reassert an expiring CBI claim for up to an additional 10 years, a company must submit a request for an extension that substantiates the need for continued protection of the information from disclosure. The information below describes which CBI claims require an extension, how EPA will notify submitters of expiring CBI claims, the process for requesting an extension, and the EPA review process.

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## With national PFAS standards in flux, New Hampshire regulators try to move forward

NHPR · 23 Apr 2026

When the first federal rules limiting a handful of so-called “forever chemicals” in drinking water were adopted in 2024, advocates who had long fought for stricter regulations on harmful PFAS chemicals celebrated.

The limits set by the U.S. Environmental Protection Agency two years ago were lower than the limits New Hampshire regulators set in 2019. They only applied to six of the roughly 15,000 PFAS chemicals. But state officials worried about the costs and feasibility of implementing stricter limits on a substance that has made its way into every part of life, and the bodies of essentially all Americans.

The Biden administration argued the benefits – longer, healthier lives for people across the country – outweighed the costs. States were expected to adopt those new standards by the end of this month.

But in September, the EPA under the Trump administration asked states to delay the adoption of those standards, after they had announced months earlier they would roll back limits on four of the newly-regulated PFAS chemicals.

The proposed changes exclude newer PFAS chemicals that are still being used from regulation and only limit older chemicals that have already been phased out.

“It’s kind of giving industry a way out,” said Julia Varshavsky, a public health and engineering professor at Northeastern University.

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## What’s in the Water? EPA Signals Direction of Future Drinking Water Regulations

JD Supra · 17 Apr 2026

On April 6, 2026, the U.S. Environmental Protection Agency (EPA) published in the Federal Register its draft Sixth Contaminant Candidate List (CCL), which lists contaminants currently not subject to any national primary drinking water regulations. These contaminants are either presently known or in the future will appear in public water systems and may be subject to future regulations under the Safe Drinking Water Act (SDWA). This draft Sixth CCL contains 75 individual chemicals, 9 microbes, and 4 main chemical groups: disinfection byproducts (DBPs), microplastics, per and polyfluoroalkyl substances (PFAS), and pharmaceuticals.

The CCL essentially acts as the first step in identifying contaminants for future regulation under the SDWA. Inclusion on the CCL does not automatically mean that a contaminant will be regulated in the future but rather provides the initial framework for contaminants that require further investigation. Furthermore, under the SDWA, the EPA must make a regulatory determination for at least five contaminants on the CCL every five years.

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## EUROPE

### Largest-ever ban on toxic chemicals in EU hit by 'extremely frustrating' delays

The Guardian · 24 Apr 2026

Green groups say European Commission is 'chief roadblock' to its own plans, as report finds poor progress four years on

Harmful compounds in children's nappies and toxic "forever chemicals" in everyday products are among 14 hazardous substance groups hit by lengthy delays to EU pollution controls, according to report findings described by scientists as "extremely frustrating".

The European Commission sought to push broad categories of dangerous substances off the market with a "restrictions roadmap" in April 2022 that was hailed at the time as the largest-ever ban of toxic chemicals.

But four years later it has failed to start the process of regulating seven of the 22 hazardous chemical groups and has "effectively frozen" progress in regulating seven more, according to a progress check by ClientEarth and the European Environmental Bureau.

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### National registry for radiation workers: guidance

Gov.UK · 21 Apr 2026

The National Registry for Radiation Workers (NRRW) is a UK-based study and database established to monitor the health effects of long-term, low-dose occupational exposure to ionizing radiation.

National guidelines and regulations restricting occupational exposure to ionising radiation are set by the Health and Safety Executive (HSE) to protect the health of workers in the UK.

The guidelines are largely based on estimates of the long-term health risks following exposure to ionising radiation obtained from studies of survivors of the atomic bombings of Hiroshima and Nagasaki in 1945 and from certain groups exposed to radiation for medical reasons.

However, there is uncertainty about whether the radiation risks seen in the atomic bomb survivors are applicable to UK radiation workers and the general public.

First, the atomic bomb survivors received a single external radiation dose over a very short time period (up to several seconds). The amount of dose received was mainly influenced by an individual's distance from the explosions, but many individuals received very high doses.

In contrast, nuclear workers are generally exposed to very low doses over long periods of time, ranging up to many years. It is not clear if a dose received by a UK worker at a low exposure rate over many years has the same capacity to induce disease as the same dose received at a very high rate over a short period of time.

Second, the underlying rates of some common diseases among the atomic bomb survivors are significantly different to those in UK workers and the public. This adds to the uncertainty about extrapolating the radiation-related risk estimates for these diseases to UK workers.

As a result of these 2 issues, a need was identified to directly estimate radiation risks among those in the UK exposed occupationally and the public so that these estimates could be compared to those derived from the atomic bomb survivors.

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## INTERNATIONAL

### Chemical content validation of recycled plastics - Report

OECD · 13 Apr 2026

Plastics are versatile materials that are used across multiple applications and sectors delivering many benefits to society. Plastics may include thousands of different chemicals, including some that raise particular concern and may have negative impacts on human health and the environment if not properly managed. Identifying these substances becomes even more challenging when materials are recycled, as chemical information may be incomplete or lost along value chains and new contaminants, degradation products or reaction products can emerge during use and recycling. The heterogeneity of plastic waste, with limited source separation of closed loop systems, increases this complexity. This report provides an overview of the chemical considerations integrated into standards, certifications and quality control measures for recycled plastics, and examines analytical techniques used to characterise the chemical content of secondary materials. Overall, ensuring chemical safety in recycled plastics requires an integrated approach combining harmonised international standards, robust analytical techniques, chemical traceability systems, economic incentives and research collaboration. Together, these elements can support safe and sustainable circularity while maximising recycling rates.

https://www.oecd.org/content/dam/oecd/en/publications/reports/2026/04/chemical-content-validation-of-recycled-plastics_989dd186/7c862db6-en.pdf

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### Expression of Interest: Participation in the Global Interlaboratory Assessment 2026

UNEP · 17 Apr 2026

Global Interlaboratory Assessment on Persistent Organic Pollutants (POPs) and Mercury – Fifth Round, 2026

After the successful organization of the fourth Rounds of the biennial Global Interlaboratory Assessment on Persistent Organic Pollutants (POPs), the Chemicals and Health Branch, Industry and Economy Division of the United Nations Environment Programme (UNEP) has announced the launch of the Fifth Round of the Global Interlaboratory Assessment and opens registration for interested laboratories to participate. Interlaboratory assessments are crucial for ensuring comparability and harmonization of POPs and mercury monitoring data among global, regional, and local laboratories. These assessments are key to evaluating the analytical performance of participating laboratories in analyzing POPs and mercury in environmental and biotic samples. Given that it would be overwhelming for a single laboratory to analyze all target compounds across all core matrices relevant to the Stockholm and Minamata Conventions, regional and international collaborations are crucial to ensure that data are generated consistently and in a cost-efficient manner.

**Programme:** GEF-funded and UNEP-led Global Chemicals Monitoring Programme (GCMP).

**Purpose of the programme:** The programme aims to provide scientifically robust evidence for evaluating the effectiveness of the Stockholm Convention on POPs and the Minamata Convention on Mercury. It also aims to facilitate a comprehensive global understanding of the concentrations of POPs and mercury in humans and the environment. Furthermore, it seeks to use POPs and mercury monitoring data to support regional and national governance in managing these toxic chemicals.

**Who can participate:** Public laboratories, academic and research institutions, non-profit organizations, and qualified private laboratories with state-of-the-art facilities that are engaged in the environmental and/or biological monitoring of POPs and mercury.

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## ILO and China sign an agreement on Occupational Safety and Health under the Global Development Initiative

ILO · 14 Apr 2026

The International Labour Organization and the State Administration for Market Regulation of the People's Republic of China have signed a Memorandum of Understanding to strengthen cooperation in special equipment safety and occupational safety and health.

The ILO and the State Administration for Market Regulation (SAMR) of the People's Republic of China have signed a Memorandum of Understanding to strengthen cooperation in special equipment safety and occupational safety and health. Signed on 14 April 2026 in Geneva, the agreement reflects a shared commitment to advancing social justice, decent work, and the recognition of OSH as a fundamental principle and right at work.

The cooperation will focus on several key areas of intervention. First, the partnership will support the exchange of regulatory frameworks, policies, and enforcement practices on special equipment safety and OSH. It will also promote the development of preventive approaches to foster safer working environments.

A strong emphasis will be placed on capacity building and skills development. This includes strengthening institutional capacity through training programmes, technical exchanges, and development of training materials, as well as joint implementation of training initiatives, including volunteer programmes. These efforts will contribute to building technical expertise capable of advancing OSH practices.

The cooperation will further enhance data collection and reporting on safety conditions, while facilitating knowledge sharing and coordination among stakeholders to improve global safety practices. In addition, it will support the promotion and dissemination of new technologies, tools, and protective methods to improve workplace safety and prevention mechanisms.

Awareness raising and advocacy will also form a core component of the partnership, including the promotion of international awareness and advocacy activities to promote OSH and decent work, and to strengthen a culture of safety. Finally, the cooperation will advance South-South collaboration and peer learning, including technical assistance to developing countries.

As a result of these interventions, the partnership is expected to achieve improved alignment of laws and standards with international frameworks, strengthened institutional capacity for OSH governance, and enhanced availability and quality of data. It will also lead to increased awareness and adoption of practices, expanded technical expertise, greater uptake of innovative safety technologies, and stronger global cooperation. Ultimately, these efforts will contribute to safer employment and more inclusive employment opportunities.

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# HAZARD ALERT

## Malathion

1 May 2026

Malathion is an organophosphate parasympathomimetic that binds irreversibly to cholinesterase and has the molecular formula C10H19O6PS2. [1] It is a colourless liquid in pure form and a brownish-yellow liquid with a garlic smell when part of a technical grade solution. It is manufactured and does not occur naturally in the environment. [2] Malathion is an insecticide of relatively low human toxicity. In Australia and New Zealand it is known as maldison. [1]

### Uses [3]

Malathion is a pesticide that is used to kill insects on agricultural crops, on stored products, on golf courses, in home gardens, and in outdoor sites where trees and shrubs are grown at home; it is also used to kill mosquitoes and Mediterranean fruit flies (medflies) in large outdoor areas. Additionally, malathion is used to kill fleas on pets and to treat head lice on humans. It is usually sprayed on crops or sprayed from an airplane over wide land areas, especially in the states of California and Florida.

### In the Environment [3]

Once malathion is introduced into the environment, usually from spraying on crops or in wide urban/residential areas, droplets of malathion in the air fall on soil, plants, water, or man-made surfaces. While most of the malathion will stay in the areas where it is applied, some can move to areas away from where it was applied by rain, fog, and wind. Malathion stays in the environment from a few days to several months, but is usually broken down within a few weeks. It is broken down to other chemical compounds by water, sunlight, and bacteria found in soil and water. Malathion does not tend to stick to the soil and is rapidly broken down by bacteria; thus, it is unlikely that malathion will reach groundwater in significant amounts. In water, malathion breaks down quickly by the action of the water and the bacteria in the water. In air, malathion is broken down by reacting with other chemicals formed naturally in the air by sunlight, to form a more toxic product called malaoxon. If malathion is present on dry soil or on man-made surfaces such as sidewalks, pavements, or playground equipment, it usually does not break down as fast as it would in moist soil.

### Sources & Routes of Exposure [2]

#### Sources of Exposure

General Populations

- The general population is not likely to be exposed to high levels of malathion.
- Exposure to malathion predominantly occurs through ingestion of contaminated food or water.

- People living near areas where malathion is sprayed have a greater risk of being exposed through dermal contact with contaminated plants and soils, inhalation of mist formed during application, and ingestion of residues in food or water.

Occupational Populations

- Workers involved in the production, formulation, handling, and application of malathion are likely to have the highest levels of exposure.
- Farm workers who enter treated fields prior to the passage of the appropriate restricted entry intervals may also be exposed to high levels of malathion.

**Routes of Exposure**

The following are the routes of exposure for malathion:

- Inhalation – Minor route of exposure for the general population.
- Oral – Predominant route of exposure for the general population through ingestion of contaminated food or water.
- Dermal – Minor route of exposure for the general population. Predominant route of occupational exposure.

## Health Effects [3]

Malathion interferes with the normal function of the nervous system. Because the nervous system controls many other organs, malathion indirectly can affect many additional organs and functions. Exposure to high amounts of malathion in the air, water, or food may cause difficulty breathing, chest tightness, vomiting, cramps, diarrhoea, watery eyes, blurred vision, salivation, sweating, headaches, dizziness, loss of consciousness, and death. If persons who are exposed accidentally or intentionally to high amounts of malathion are rapidly given appropriate treatment, there may be no long-term harmful effects. If people are exposed to levels of malathion below those that affect the function of the nervous system, few or no health problems seem to occur. This has been shown in studies with volunteers who inhaled or swallowed small known amounts of malathion. There is no evidence that malathion affects the ability of humans to reproduce. There is also no conclusive proof that malathion causes cancer in humans, although some studies have found increased incidence of some cancers in people who are regularly exposed to pesticides, such as farmers and pesticide applicators. The International Agency for Research on Cancer (IARC) has determined that malathion is unclassifiable as to carcinogenicity to humans.

## Safety [4]

**First Aid Measures**

- Inhalation: Remove source of contamination or move victim to fresh air. Keep affected person warm and at rest. Supply oxygen if necessary. Treat symptomatically and supportively. Seek medical advice immediately.
- Skin contact: Remove contaminated clothing, shoes and leather goods. Gently wipe of excess chemical. Wash skin gently and thoroughly with water and non-abrasive soap. Seek medical advice if necessary. Persons who become sensitised may require specialised medical management with antiinflammatory agents.
- Eye contact: Immediately flush eyes with gently flowing cold water or saline solution for 20 minutes, holding the eyelid(s) open. Seek medical attention immediately.

- Ingestion: Have victim rinse mouth thoroughly with water. Do not induce vomiting, due to the aromatic solvent. Seek medical advice immediately.
- Advice to physician: Atropine must be administrated as early as possible and could save lives, if given in time and in an adequate dosage.

**Exposure Controls & Personal Protection**

**Engineering controls**

- It is essential to provide adequate ventilation.
- Ensure that control systems are properly designed and maintained.
- Comply with occupational safety, environmental, fire and other

applicable regulations.

**Personal Protective Equipment**

If engineering controls and work practices are not effective in controlling exposure to this material, then wear suitable personal equipment including approved respiratory protection.

- Respirator: An approved full-face respirator suitable for protection from dusts or mists of pesticides is required. Limitations of respirator use specified by the approving agency and the manufacturer must be observed.
- Clothing: Employee must wear appropriate protective (impervious) clothing and equipment to prevent skin contact with the substance.
- Gloves: Employee must wear appropriate chemical resistant protective gloves to prevent contact with this substance.
- Eye protection: Employee must wear splash-proof safety goggles and face shield to prevent contact with this substance.
- Emergency eye wash: Where there is any possibility that an employee's eyes may be exposed to this substance, the employer should provide an eye wash fountain or appropriate alternative within the immediate work area for emergency use.

## Regulation [3,5]

**United States**

**OSHA:** The Occupational Safety & Health Administration has set the following Permissible Exposure Limit (PEL) for malathion:

- General Industry: 29 CFR 1910.1000 Z-1 Table -- 15 mg/m3 TWA; Skin
- Construction Industry: 29 CFR 1926.55 Appendix A -- 15 mg/m3 TWA; Skin
- Maritime: 29 CFR 1915.1000 Table Z-Shipyards -- 15 mg/m3 TWA; Skin

**ACGIH:** The American Conference of Governmental Industrial Hygienists has set a Threshold Limit Value (TLV) for malathion of 1 mg/m3 TWA - Inhalable fraction, Vapour and aerosol; Skin; Appendix A4 - Not Classifiable as a Human Carcinogen; BEI - Appendix A: Carcinogens

**NIOSH:** The National Institute for Occupational Safety and Health has set a Recommended Exposure Limit (REL) for malathion of 10 mg/m3 TWA; Skin

**EPA:** The Environmental Protection Agency states that the following levels of malathion in drinking water are not expected to cause effects that are harmful to health:

0.2 milligrams per litre (mg/L) for 1 day, 10 days, or longer-term exposure for children, and

0.1 mg/L for lifetime exposure of adults.

EPA also has set maximum levels of malathion residues in meat and dairy products, vegetables, fruits, tree nuts, cereal grains, and grass forage, fodder, and hay. EPA requires notification to the Agency of spills or accidental releases of 100 pounds or more of malathion to the environment.

### Australia

**Safe Work Australia:** Safe Work Australia has established a Time Weighted Average Concentration (TWA) for malathion of 10 mg/m3 for a 40-hour workweek.

### References


- http://en.wikipedia.org/wiki/Malathion
- http://www.atsdr.cdc.gov/toxguides/toxguide-154.pdf
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- http://msdssearch.dow.com/PublishedLiteratureDAS/dh_0060/0901b80380060a74.pdf?filepath=/011-10176.pdf
- https://www.osha.gov/dts/chemicalsampling/data/CH_250000.html
- http://www.safeworkaustralia.gov.au/sites/SWA/about/Publications/Documents/772/Workplace-exposure-standards-airborne-contaminants.pdf

# JANET'S CORNER

## Who Am I?

1 May 2026

I am born from fire and stone, my ancient recipe whispered through Roman aqueducts and perfected over millennia.

My strength comes from a chemical marriage between limestone and silica, bound together by the heat of a kiln.

I am the world's most-produced material by mass, poured into foundations, roads, and skyscrapers that define our cities.

My main ingredient is Portland cement, mixed with water, sand, and gravel to create the hardened paste that builds our infrastructure.