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Czech Advanced Technology and Research Institute

NEWSLETTER 01/2021

Bacterial resistance can be overcome by a mechanical barrier

A new way to overcome bacterial resistance to the antimicrobial effects of nanosilver

Genome editing

Regulation of new breeding methods hinders European economy

ArgeCure

Scientists designed a new material not just for nanomasks

EFB2021

CATRIN researchers made a significant contribution to the conference

Bacterial resistance can be overcome by a mechanical barrier

Researchers from Palacký University have discovered a new way to overcome bacterial resistance to the antimicrobial effects of nanosilver. A graphene derivative — cyanographene — was used as an effective barrier to which researchers at CATRIN anchored silver nanoparticles with a very strong bond. The results were published in the journal Advanced Science, which also selected the topic for its cover.

“We've managed to create such a strong bond between the chemical groups on the surface of graphene and the silver nanoparticles that even the bacterial resistance mechanism can't overcome it. That's why our process is so unique. We didn't have to use any other chemicals,” said the first author of the paper, Ph.D. student David Panáček.

The anchored nanoparticles showed higher efficiency than commonly used nanosilver and were non-toxic to human cells. “Moreover, the strong anchoring of nanosilver by chemical bonds prevents its eventual release into the organism. The developed material has particular potential for use in local antibacterial therapy as part of wound dressing or healing creams and ointments,” explained another author of the study, Radek Zbořil.

> „I believe our team is opening new doors for tackling the issue of bacterial resistance to antibiotics in order to ensure the continued treatment of bacterial infections.
>
> **Milan Kolář**

Silver nanoparticles have been increasingly used in modern medicine to support or partially replace antibiotic treatment, mainly due to the dramatically increasing bacterial resistance to antibiotics. Current medicine is confronted with the real threat of losing the effect of antibiotics on bacteria and the associated ability to treat bacterial infections.

“This requires the development of new and fully original antibacterial products. With this research, I believe our team is opening new doors for tackling the issue of bacterial resistance to antibiotics in order to ensure the continued treatment of bacterial infections. Equally important is the ability of the developed material to prevent infections related to artificial materials in the human body, which is important, for example, in the case of artificial heart valves or joint replacements. Of course, further research is needed to enable practical applications in clinical medicine,” said Milan Kolář from the Institute of Microbiology of the Faculty of Medicine and Dentistry and the University Hospital Olomouc.

The breakthrough discovery that bacteria can develop resistance to nanosilver was made three years ago by Olomouc scientists (Nat. Nanotechnol. 13, 65-71, 2018).

Back then, they circumvented the bacterial resistance mechanism by natural substances. An extract from pomegranate bark was added to the silver nanoparticles, which inhibited the production of flagellin. This prevented the silver nanoparticles from clustering, thus overcoming bacterial resistance to the nanoparticles. However, the current solution of creating a mechanical barrier is more universal, as scientists point out.

Panáček D., Hochvaldová L., Bakandritsos A., Malina T., Langer M., Belza J., Martincová J., Večeřová R., Lazar P., Poláková K., Kolařík J., Válková L., Kolář M., Otyepka M., Panáček A., Zbořil R.: Silver Covalently Bound to Cyanographene Overcomes Bacterial Resistance to Silver Nanoparticles and Antibiotics, Advanced Science 2021, 2003090. IF = 15,84

Solar nanofurnaces can generate steam as well as producing nanomaterials

Solar nanofurnaces designed by CATRIN scientists in collaboration with colleagues from the US, Germany and Italy offer benefits of high efficiency and stability, low production costs and technological requirements, and a wide range of potential applications. These ultra-small devices can be used for removing toxic gases and desalinating seawater, as steam generators and chemical reactors for the production of nanomaterials.

“The essence of our technology is titanium nitride nanotubes, which have similar thermoplasmonic properties to gold nanoparticles but are approximately forty times cheaper. In addition, they show high temperature stability and have a cylindrical shape suitable for use as nanofurnaces or chemical reactors. The developed technology enables rapid conversion to an industrial scale and production of films or panels seeded with billions of densely arranged nanofurnaces,” said the project’s main author, Alberto Naldoni from CATRIN. Nanofurnaces several tens of nanometres in diameter can be made in the form of thin films or panels, and by transforming solar energy in them, temperatures of up to 600 °C can be reached. The results of this unique technology are now protected by an international patent application.

Scientists have also demonstrated the extraordinary efficiency of nanofurnaces as solar water vapour generators. Thus, the developed nanosystems are currently being tested in new seawater desalination technologies. In addition to scientists from CATRIN and VŠB-TUO, researchers from Purdue University and Rice University in the US, universities in Trieste and Milan, Italy and the University of Erlangen-Nuremberg, Germany participated in this multi-year project.

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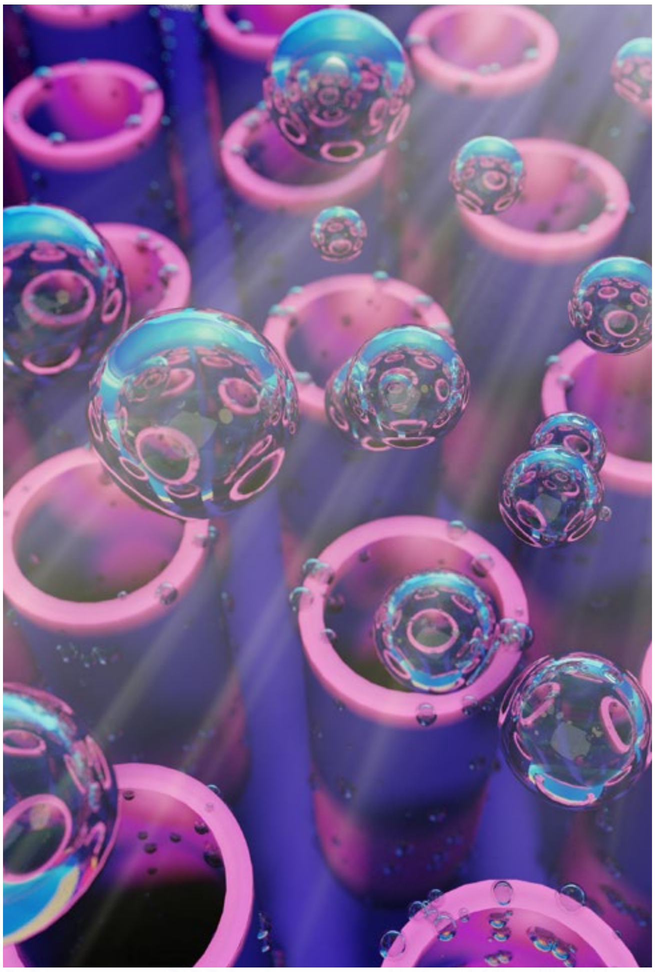
Naldoni A., Kudyshev Z.A., Mascaretti L., Sarmah S.P., Rej S., Froning J.P., Tomanec O., Yoo J.E., Wang D., Kment Š., Montini T., Fornasiero P., Shalaev V.M., Schmuki P., Boltasseva A., Zbořil R.: Solar Thermoplasmonic Nanofurnace for High-Temperature Heterogeneous Catalysis, Nano Letters, 2020, 20 (5), 3663–3672. IF = 11,23



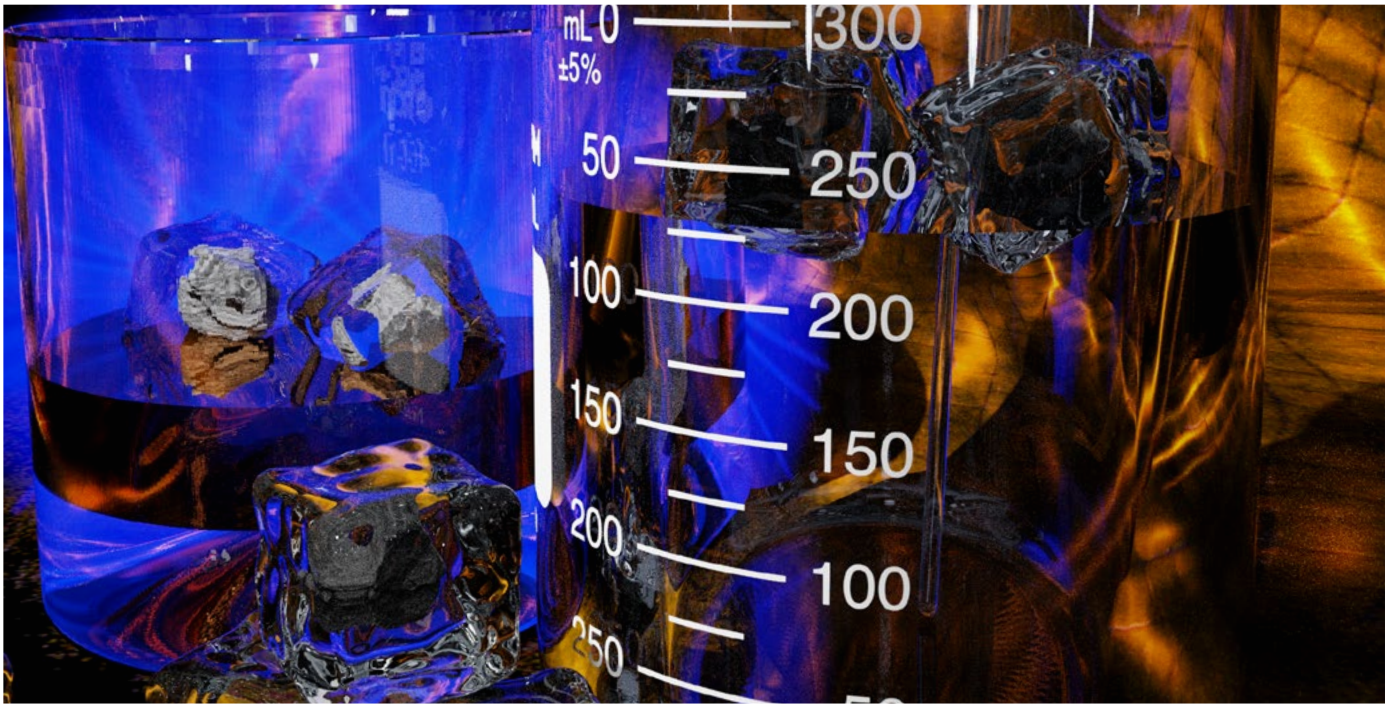
Regulation of new breeding methods hinders European economy

Solar nanofurnaces designed by CATRIN scientists in collaboration with colleagues from the US, Germany and Italy offer benefits of high efficiency and stability, low production costs and technological requirements, and a wide range of potential applications. These ultra-small devices can be used for removing toxic gases and desalinating seawater, as steam generators and chemical reactors for the production of nanomaterials.

New techniques, in particular genome editing, make it possible to make targeted and cautious changes in DNA sequences that occur spontaneously in nature, thus creating new crop varieties with better characteristics, such as higher yields, resistance to pests and climate change and higher content of substances beneficial for health. However, a ruling by the European Court of Justice in 2018 interprets the current legislation as meaning that all organisms prepared by modern genome editing procedures fall into the category of GMOs, and are therefore subject to strict regulation. This reduces the competitiveness of EU countries in breeding new crops.

„The European Union will be more dependent on imports of products developed and manufactured outside the EU, which will have a negative impact on the economy and the environment,“ Frébort said. According to the article’s authors, problems will be particularly felt by smaller and local producers, who will be unable to compete with large companies. Without the possibility of growing crops using modern breeding methods, European agriculture will not be able to reduce the consumption of water, fertilizers and pesticides. Failure to develop pathogen-resistant varieties can also lead to reduced biodiversity.

Hjort C., Cole J., Frébort I.: European genome editing regulations: threats to the European bioeconomy and unfit for purpose, EFB Bioeconomy Journal 2021, 1, 10001.



Carbon dots could help in lung cancer screening

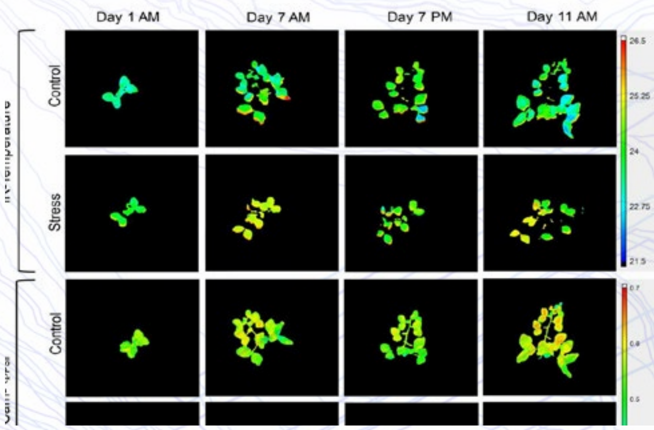
The mechanism behind the quenching of the fluorescence of carbon dots during the water–ice phase transition has been revealed by CATRIN scientists in collaboration with colleagues from the City University of Hong Kong. They have capitalized upon their discovery by designing a method that could become a low-cost, non-invasive diagnostic tool in early-stage lung cancer screening.

Fluorescence emitted from molecular fluorophores present on the surface of carbon dots is quenched when liquid water enters a solid phase, mainly due to a significant increase in the relative environmental permittivity. However, by adding low molecular weight alcohols, such as methanol, ethanol or isopropanol, carbon dots show fluorescence even in the solid phase. Understanding this mechanism may enable carbon dots to be used as a non-invasive switching sensor of this phase transition but also to detect small concentrations of low molecular weight alcohols in water.

The presence of low molecular weight alcohols in exhaled breath is considered to be one of the markers of lung cancer. Therefore, this study included a pilot experiment on exhaled breath condensate. "This does not contain any low molecular weight alcohols in healthy individuals, and thus in our system, behaves like ice by quenching the fluorescence of carbon dots. However, when we added a small amount of isopropanol to the exhaled breath condensate, it accumulated on the surface of the carbon dots and the fluorescence remained. The method provides a promising route for the low cost and non-invasive diagnosis of lung cancer," explained one of the authors of the study, Sergii Kalytchuk from the RCPTM.

Kalytchuk S., Zdražil L., Baďura Z., Medveď M., Langer M., Paloncýová M., Zoppellaro G., Kershaw S. V., Rogach A.L., Otyepka M., Zbořil R.: Carbon Dots Detect Water-to-Ice Phase Transition and Act as Alcohol Sensors via Fluorescence Turn-Off/On Mechanism, ACS Nano 2021, 15 (4), 6582–6593. IF = 14,58

Loss of oleic acid indicates water deficit in plants



Are there markers that show that plants are starting to suffer from water deficit? The answer to this question has been discovered by researchers from CATRIN in cooperation with colleagues from Poland, Germany and Belgium. They identified specific metabolites related to the response of plants to water deficit. One of them - oleic acid - has not previously been described in this context. The description of identification features is important for basic research and could be used for screening methods. The results of approximately two years of research were published in The Plant Journal.

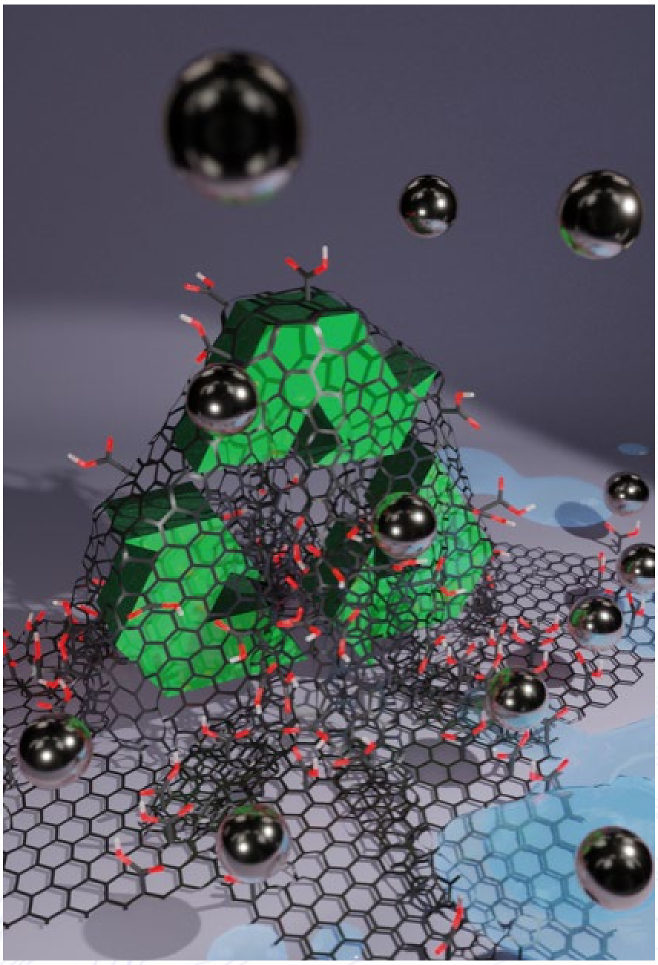
The researchers studied pea plants during their growth for three weeks. Plants that received reduced watering were compared to those with enough water.

„During the experiment, we monitored the phenotype with our modern non-invasive methods. We analyzed the morphology of the plants, i.e. whether they changed shape, leaf size and total biomass. At the same time, we monitored their physiological state, studied all the essential parameters of photosynthesis and determined by thermal analysis how the plant manages water. Another part of the research was the collection of phloem juice to determine the content of metabolites from phloem pathways, which are used to distribute nutrients. By statistical analysis, we identified the metabolites that correlated the most with the physiological changes in plants signaling a lack of water," explained one of the authors, Lukáš Spíchal.

Under mild drought stress, the researchers described 30 statistically significant metabolites in plants. Many of them were already known to be linked to plant defense mechanisms against drought. However, the study was the first to describe oleic acid in this context. Its decrease in the phloem juice, which occurred after several hours, could be used as a marker for early detection of whether a plant has been exposed to a water deficit. „We also tried to compare the contents of metabolites with the phenotype of plants. The phenotype was not very distinct because the plants did not show significant changes at first glance. For example, we used thermal imaging to monitor the temperature of leaves. Changes in the temperature indicate how plants open or close vents while losing water. Therefore, this

Blicharz S., Beemster G.T.S., Ragni L., De Diego N., Spíchal L., Hernándiz A.E., Marczak L., Olszak M., Perlikowski D., Kosmala A., Malinowski R.: Phloem exudate metabolic content reflects the response to water-deficit stress in pea plants (Pisum sativum L.), Plant Journal 2021, in press; DOI: 10.1111/tpj.15240. IF = 6,14

Graphene acid can purify water from heavy metals



Heavy metals, which are among the most common and highly toxic sources of water contamination, can be removed by a new type of sorbent based on graphene acid developed by a team of scientists from CATRIN, the VSB - Technical University of Ostrava and the Institute of Organic Chemistry and Biochemistry of the Czech Academy of Sciences. The results of the study so far have been published in the American Chemical Society journal ACS Nano. The sorbent can also be used to extract noble metals from aqueous environments.

Current sorption technologies are often hampered by low efficiencies of capturing heavy metals and low interaction of the sorbent with metals, thereby increasing the risk of re-releasing heavy metals into the environment. However, the newly designed sorbent overcomes these weaknesses. "It is a two-dimensional layer of carbon covered with carboxyl groups that serve as a binding bridge for capturing heavy metals. Since they're bound by a fairly strong bond, there's no leaching. After subsequent separation, by changing the pH of the solution, it is easy to separate heavy metals from the 2D sorbent, which can be used repeatedly for further decontamination without loss of efficiency," explained the principle corresponding author, Radek Zbořil. The large surface area of graphene acid and high coverage of carboxylic bridges enable exceptionally high efficiencies to be achieved, e.g. for removing highly toxic lead or cadmium. The same technology can be used to extract noble metals, such as palladium, gallium and indium, that have been released into aqueous environments.

Graphene acid is a two-dimensional organic acid. Olomouc scientists have prepared it using the 2D chemistry of fluorographene, which they have researched extensively thanks to the support of a grant from the European Research Council.

Kolařík J., Bakandritsos A., Bad'ura Z., Lo R., Zoppellaro G., Kment Š., Naldoni A., Zhang Y., Petr M., Tomanec O., Filip J., Otyepka M., Hobza P., Zbořil R.: Carboxylated Graphene for Radical-Assisted Ultra-Trace-Level Water Treatment and Noble Metal Recovery, ACS Nano 2021, 15, 3349-3358. IF = 14, 58

Physical chemist Pavel Banáš is an expert in molecular dynamics simulations of nucleic acids. However, recently, he has had to put his own research aside as in January 2021, he became Head of the **Czech Advanced Technology and Research Institute** (**CATRIN**)*, a university institute with huge ambitions.*

CATRIN has a well-established team eager to compete and win

Six months has already passed since you were appointed as CATRIN Director. How is it going so far?

Frankly, it's been very hectic and demanding, especially the first few months were critical. We had to get a whole new part of the university going and set up its operation, from basic administration to the key areas of grant support and technology transfer. But it has also brought plenty of joy as it's constructive and meaningful work.

What stage is the set-up of CATRIN in now?

In a recent interview, the former UP Rector Jaroslav Miller used sports terminology, pointing out that key scientists as well as key athletes cannot be easily replaced. I completely agree with that statement, and if I were to continue with this sports analogy, CATRIN has managed to keep its best players and has a well-established team with great enthusiasm to compete and win. What I'm saying is that we've reached a stage where the integration of research centres has opened up new opportunities for us to capitalize upon what we are best at — hard and honest work producing cutting-edge science.

CATRIN has ambitions to become one of the best science centres in Europe. What strategy are you following to achieve this?

We continue the trend towards internationalisation of the institution, with half of the staff already being from abroad. We also want to develop research teams around young talented scientists and set clear rules for the formation of junior groups. Priority will be given to international grant schemes, notably within the programme called Horizon Europe, and the systematic development of cooperation with excellent institutions abroad, as well as industrial partners. We are also planning an internal evaluation of the research groups by our international scientific board at the turn of the year.

CATRIN is an open structure emphasizing multidisciplinary research. What research lines now dominate?

At the moment, CATRIN focuses on nanotechnology, materials research, biotechnology, agricultural research, biomedicine and translational medicine. Thus, in the natural and medical sciences, we have covered the key areas of research in sustainable environmental issues and climate change adaptation, ranging from the development of new technologies for the extraction and preservation of clean energy and environmental remediation to the development of new, more resilient crops and technologies for the circular economy. The second important issue is the development of new technologies and practices applicable to biomedicine, including diagnosis, prevention and therapies for infectious diseases and cancer.

What are the biggest challenges facing you?

From an organisational and economic standpoint, the big challenge is the end of funding from operational programmes after the year 2022, when we will have to restructure our research funds and focus much more on international grant schemes, which we are already systematically preparing for. However, all three research centres that were integrated into CATRIN have easily coped with such situations twice before. From a scientific perspective, we need to improve our technology transfer capabilities. We do cutting-edge, fundamental and applied research, yet only a few technologies have been able to move beyond TRL 4 on the technology readiness level scale. We also want to deepen the multidisciplinarity of our research and build bridges to the social sciences and humanities. This is proving to be the broader and increasingly urgent challenge of all modern science. Although it's fascinating when we manage to develop new materials and technologies, such as new hardier and nutritionally richer crops using modern genetic techniques, it would be futile work if society were not ready for them, unable to utilize them or even rejected them.

So you are optimistic about the future?

Absolutely. CATRIN is full of brilliant people with great enthusiasm, including scientists and administrative staff, who are determined to work hard to build an excellent world-class research institute. We have a number of top scientists, well-functioning research teams and are able to find new interdisciplinary and transdisciplinary cooperation across the entire institute. In addition, we are discussing future cooperation and possible partnership with several excellent institutions abroad. So, it is already clear that the integration of research capacities at Palacký University made profound sense from a scientific perspective.

doc. Mgr. Pavel Banáš, Ph.D.
(*1980)

He graduated from the Faculty of Science of Palacký University Olomouc in Analytical Chemistry and Applied Physics with a focus on Instrument Physics and Metrology. He received a doctorate in Physical Chemistry in 2009 and became associate professor in the same field in 2013. Until 2020, he acted as an associate professor in the Department of Physical Chemistry and the Regional Centre of Advanced Technologies and Materials of the Faculty of Science of Palacký University. Between the years 2019 and 2020, he was a Vice-Rector for the Strategy of Science and Research of Palacký University. As of 1 January 2021, he has hold the position of the Director of the Czech Advance Technology and Research Institute.

During his doctoral studies, he completed internships at SISSA—Scuola Internazionale Superiore di Studi Avanzati in Trieste (Italy) and Uppsala Biomedical Centre (Sweden), then also at the University of Michigan in Ann Arbor (USA). Between the years 2006 and 2009 he was a researcher at the Institute of Organic Chemistry and Biochemistry of the Czech Academy of Sciences in Prague and since 2009 he has been a researcher at the Institute of Biophysics of the Czech Academy of Sciences in Brno.

His professional interest is the theoretical study of the structure and dynamics of nucleic acids and the development of theoretical methods for describing the conformative behaviour of biomolecules. In his research, he collaborates with experimental and theoretical teams from a number of international scientific institutions.

He's married with three great children—Kateřina, Marek and Antonín. As a former member of the Scouts, he likes to go trekking in the mountains and enjoys rock climbing.

Tomáš Malina
I check whether nanomaterials are used safely

Tomáš Malina received a master's degree in molecular and cell biology, but during his studies, he became keenly interested in the nanoworld. He has managed to combine both interests by researching the interactions of carbon nanomaterials with cell lines, a crucial factor in considering their appropriate application in, for example, biomedicine or the environment. Among other topics, this junior scientist is investigating whether these materials can harm human cells or organisms in nature. He also addressed this issue during his four-month internship at the Swiss EMPA Research Institute in Peter Wick's lab.

"The purpose of my stay was to test the acute toxicity of our graphene derivatives, i.e. cyanographene and graphene acid, in an advanced endothelial cell model that was available at the research institute. The model consisted of immune system cells and endothelial cells to mimic the conditions of the bloodstream after intravenous application of materials. Although I have not completed the research yet, it has so far confirmed that neither of our materials caused any harmful effect in the model. Moreover, in terms of their properties, they both surpass the most used derivative of graphene, i.e. graphene oxide, which is great news," explained Tomáš.

In addition to completing his dissertation, Tomáš is continuing his research in collaboration with the Institute of Botany of the Czech Academy of Sciences in Brno, focusing on environmental toxicity. He has so far published two articles in high ranking journals, with a third article being peer reviewed. In these, the authors confirmed that single-celled organisms found in water could cope with the presence of chemically modified graphene and were not fatally endangered by it. Subsequently, scientists have shown the same for higher organisms in an aqueous environment, specifically crustaceans.

Sanja Ćavar Zeljković
Being a scientist makes me happy

It started more than eight years ago with plant hormones strigolactones and continues to this day. Sanja Ćavar Zeljkovic came to Olomouc for the opportunity to study the youngest group of phytohormones, which, for example, regulate the growth and branching of shoots and roots, as well as seed germination. As a graduate of doctoral studies at the University of Ljubljana who already worked at the University of Sarajevo in the field of organic chemistry, she longed for more scientific work than teaching. She now devotes all her time to research at CATRIN in the Phytochemistry group.

„I managed to combine organic chemistry and phytochemistry while working on strigolactones, and I gradually expanded my research to include other plant metabolites. I mostly work on the development and optimization of liquid and gas chromatography methods with mass spectrometry for the identification of monitored molecules. Currently, I work closely with colleagues from the Phenotyping group, „ said Sanja, who can be proud of the number of articles she already has in high-impact journals and the publication success of her students. „I enjoy working with students, but I prefer being in the laboratory with my colleagues developing or optimizing methods used in plant biochemistry. I found out that being a scientist makes me the happiest." added one of the leading scientists of the research group, who can also benefit from her contacts abroad. In addition to ongoing cooperation with her home universities in Sarajevo and Ljubljana, she has established collaborations with colleagues in Poland and the Netherlands during her research internships. „In 2014, I spent four months at Radboud University, Nijmegen as part of the POST-UP project. I worked in the group of Professor Zwanenburg, one of the leading experts in strigolactone research, and our cooperation produced several highly cited articles," she added.

Apart from CATRIN, she also works at Olomouc branch of the Crop Research Institute.

Lukáš Najdekr
In science, you need to have international contacts

Lukáš Najdekr knew early on that he didn't want to be a doctor, although the profession runs in his family. Nevertheless, he's interested in clinical practice and is particularly intrigued by metabolomics, which in medicine can be used to determine metabolic biomarkers for detecting diseases or evaluating an organism's response to drugs. In particular, Lukáš sees great possibilities in lipidomics dealing with lipid molecules.

"I see a great future in this field. If we can accurately measure the profile of lipids, of which there are several hundred thousand, we will be able to predict or even prevent certain health problems much more easily. This applies, for example, to oxidative stress and ageing, which is one of the issues that I focus on a lot. In addition, we are working with colleagues in cardiology to validate lipid biomarkers and bring them into clinical practice. It would be a pity not to take advantage of the connection with the university hospital here," said Lukáš. For him, the priority is no longer to focus on one selected metabolite but on entire groups. "The point is to measure the entire profile because that gives us much more comprehensive information about the patient and could provide doctors with a useful diagnostic tool," he said.

This biochemistry graduate from Palacký University was originally going to continue in cell biology but instead took the opportunity to take a doctorate in medical genetics. From there, it was only a small step to metabolomics and the close connection with analytical chemistry. While interning in the US at Thermo Fisher Scientific, he learned a lot about the devices he uses. "In science, you need to travel and make international contacts. That's why I went to work at the University of Birmingham (UK) for three years. I returned last autumn, and we are now starting several projects," said Lukáš, who is looking forward to further work and would appreciate closer collaboration between scientists and the private sector and, above all, a reduction in red tape.

Effervescent tablets purify water in record time

Hexavalent chromium, arsenic, herbicides, pesticides and other pollutants can be efficiently removed from contaminated waters with effervescent tablets developed by CATRIN scientists. A product based on iron nanoparticles, designed mainly for environmental accidents, is already protected by a European patent.

The product was developed as part of a project funded by the Ministry of the Interior of the Czech Republic that focused on applied research and the introduction of technologies using state-of-the-art, highly reactive nanomaterials for the effective decontamination of hazardous chemicals (including chemical warfare agents) escaping, for example, in industrial or military accidents. Olomouc scientists worked with Dekonta, a.s., and the Military Research Institute. The main focus was on the rapid take-off of new (nano)technologies and the high effectiveness of their application. The resulting solution was easy, quick and relatively inexpensive since it did not require large quantities of iron nanoparticles or other reagents to purify water.

The effect was mainly confirmed by the reduction of hexavalent chromium, as well as a wide range of other inorganic substances, halogenated chemicals, endocrine disruptors, pesticides and herbicides. The product has many potential applications. For example, the tablets could be also used to clean wells contaminated during floods, swimming pools or surface waters during environmental accidents.

Evropský patent: Petala E., Filip J., Zbořil R.: Effervescent zero-valent iron compositions and method of remediation of pollutants from aqueous solutions, EP 3585736

ArgeCure not just for nanomasks

A polyurethane-based nano-fibre material with tightly anchored silver nanoparticles has been prepared by CATRIN scientists in collaboration with the UP Science and Technology Park and commercial partners. The material, called ArgeCure, is suitable for protective facemasks and respirators but could in the future be used for water filtration and wound dressing.

The material not only destroys pathogens from the external environment but also prevents the growth of bacteria and fungi. It can help to combat skin problems caused by these pathogens, which can arise in sensitive individuals when wearing protective equipment. At the same time, the material exhibits a long lifespan. Scientists have been working on development of the material since the middle of last year thanks to funding from the TACR Gama 2 programme in response to the spring wave of the covid-19 pandemic. In previous research, RCPTM scientists gained extensive experience of a similar material that is now patent protected in both Europe and the US (R. Zbořil, J. Soukupová, Method of immobilization of silver nanoparticles on solid substrates, patents: US 9505027, EP2701515). The coronavirus crisis has accelerated the development of technology to anchor active nanosilver onto the material in a strong and long-term way, greatly simplifying the future production of materials tailored for specific applications and making the translation into practice easier.

The applications range from the textile industry to wound dressing, including burns. In addition, the material has great potential as part of water filtration systems since its properties help to prevent algae and other microorganisms from growing over the filters.

Scientists form an international consortium and plan exchange internships

A joint online negotiation in January 2021 launched the NANO4TARMED project from the Twinning call of the prestigious Horizon 2020 programme.

This three-year project, with a total fund of about 19 million Czech crowns, aims to build a platform for international cooperation in research into targeted treatments for osteosarcoma, a malignant bone disease. An Olomouc team from CATRIN led by Václav Ranc is collaborating with scientists from the Consiglio Nazionale delle Ricerche in Italy and the National University of Ireland Maynooth.

“Although the covid-19 pandemic has restricted us to debating online, the principles of how the newly formed consortium will operate have been agreed. All partners have presented their research activities useful for the development of nano-platforms for targeted drug research. We are currently intensively preparing exchange internships, which are an important element in construction of the new research network,” said the principal investigator, Václav Ranc, who believes that developing a platform for international cooperation can significantly increase participants‘ chances of success in other European project calls.

The Olomouc team is contributing to the project with its experience in the development of nanoparticles, which could be used to transport drugs to the affected tissue. Colleagues from Ireland are specialists in drug development, whereas researchers from Italy will offer their expertise in testing targeted treatments on cancer cells. Both foreign partners have extensive experience in leading major European projects. Project managers from CATRIN will also benefit from such cooperation.

CATRIN strongly represented at EFB2021 conference

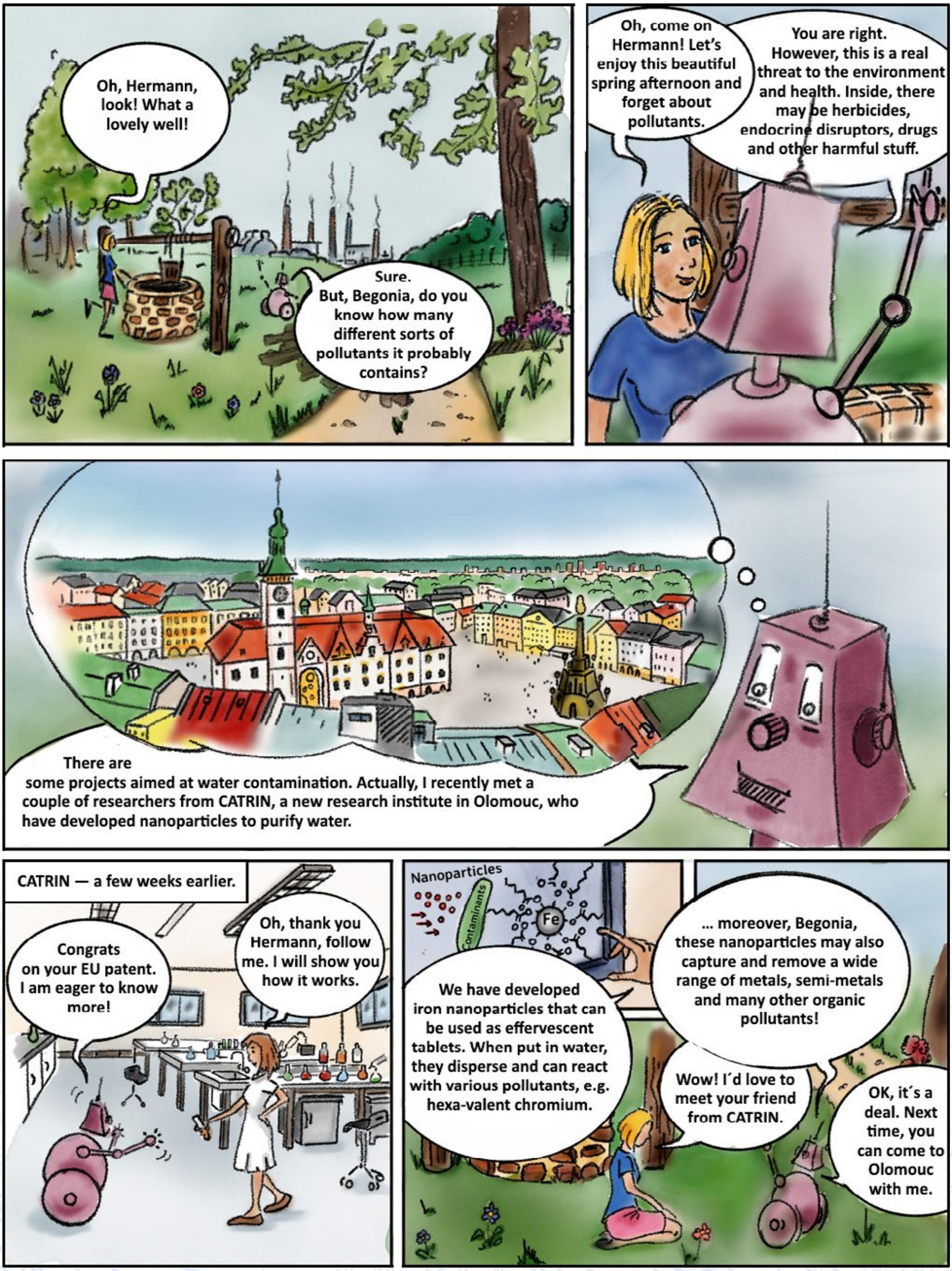
Young researchers from CATRIN took the opportunity to present their research at the May online conference EFB2021, which was the most important expert meeting of the European Federation of Biotechnology (EFB) this year. Representatives of CATRIN-CRH who work in the Czech regional branch office of the EFB also participated in the organization of the event, which had over 400 participants.

„CATRIN scientists produced about a fifth of all flash posters at the conference. They showed a wide range of research topics from phenotyping, research of the barley root system through genetic engineering methods to the possibility of using carbon dots or interaction of graphene derivatives with organisms in the aquatic environment,“ said Michaela Holecová, head of the Czech RBO and one of the four conference organizers.

The main goal of the conference was to publicly present eight divisions that emerged after the recent restructuring of the EFB in individual program sections. The division called Plants, Agriculture and Food is managed by the head of CATRIN - CRH Ivo Frébort, who is also the vice-president of the EFB. In the section dedicated to this division, Trish Malarkey from the Dutch company DSM gave a plenary lecture entitled “Food for the Future”. Her speech and subsequent lectures in the section focused on the issue of sustainable food production and the European Union‘s Farm to Fork strategy.

A separate section of the conference was dedicated to the newly created Bioeconomy Journal, which, like New Biotechnology, belongs to the portfolio of journals published by the EFB.

Well in danger by Patrick Trouillas



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