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RESEARCH

Lotus effect in furnaces: New surface from Biology allows molten iron to run off

Lotus effect for furnaces: With a liquid-repellent, heat-resistant and heat reluctant surface for copper, Prof. Christoph Neinhuis and Dr. Wilfried Konrad from the Faculty of Biology have succeeded in developing a technology of optimum resource, money and time usage. It transfers the lotus effect's evolutionary recipe for success to copper blow moulds: the components that blow hot air into furnaces and which are often destroyed by liquid metal. "The distinct processes in furnaces are widely unknown," explains Prof. Neinhuis why the project idea was much of a challenge. Additionally, the demands were high: "The surface has to allow liquid metal



From February 2018 on, the new surface will be tested in furnaces. Copyright: Siegfried Konietzko

of temperatures between 1,500 and 2,300 degree Celsius to run off without damage." The solution was inspired by a hexapod from Saxony's Elbsandsteingebirge: the springtail (Collembola). "It has a completely crazy surface structure," says Prof. Neinhuis, "with an arrangement of holes that is extremely liquid-repellent." The Collembola's holes enclose air that acts as a "cushion", separating the copper from the molten iron. The finding that these kinds of evolutionary principles prove robust even beyond the personal experiential world is "very satisfying" to Neinhuis.

Siegfried Konietzko, the project's mediator to the practice at the foundry Hundt & Weber in Gießen, has, after four years and 14 tons of test material, come to the conclusion: "From February on, the new surface will sit inside of furnaces." If the technology is going to stand the test there, between sulphur, acid, zinc, sharp-edged ore and hot air of about 1,200 degree Celsius, that would lead to massive energy savings: "When blow moulds are replaced, the furnace's periphery goes on with a huge amount of resources, without producing any iron," explains Prof. Neinhuis. "An extension of life cycles by only one to two percent will bring vast savings with it."

In search of the purest light: Alexander von Humboldt-Fellow Zhongbin Wu

Since beginning of November, Dr. Zhongbin Wu has been a guest at the Institute of Applied Physics of the TU Dresden. With the Alexander von Humboldt-Fellowship, this multi-award winning young researcher wants to develop efficient and stable WOLEDs (white organic light emitting diodes) using pure fluorescent luminescent material. They could replace unstable, resource intensive WOLEDs on phosphorbasis, having lower costs whilst producing a more even, purer light. "In addition, if Dr. Wu could succeed in fusing transistors with diodes it would be a great success," says his host Prof. Karl Leo. To begin with, Dr. Wu wants to increase the efficiency of pure fluorescent WOLEDs. He sees the key to achieving this in the increased use of excitons – electrically neutral particles, which transport excitation energy in semiconductors – by usage of new Thermally Activated Delayed Fluorescent (TADF) materials. Dr. Wu is hoping for meetings and exchange with many experts in semiconductor physics through the networked structure of the Institute and the close collaboration with the IAPP – Dresden Integrated Center for Applied Physics and Photonic Materials.



AvH Fellow Zhongbin Wu hopes to create new, efficient fluorescent light emitting diodes. Copyright: Susann Lederer

EVENTS

ERASMUS Information Event on 17th January 2018

Do you have big plans for the new year? In some cases ERASMUS-funding can help.

At the School of Science, interested parties can find out about such possibilities to discover the world with ERASMUS-funding in January next year. The Academic Affairs Office would like to invite students of the School of Science to this information event: Apart from an introduction to the ERASMUS programme by the International Office and personal reports by students, visitors will have the opportunity to ask individual questions concerning a stay abroad and to get in touch with the relevant contacts.

ERASMUS Information Event

17th January 2018

6.30 p.m.

Room: CHE 0089 E (Building
"Chemie/Hydrowissenschaften",
Bergstr.66, ground floor)

Project "NeSuD: Netzwerk für Suizidprävention in Dresden" (Network for suicide prevention) receives research funding

Prof. Jürgen Hoyer, Chair of Behavioural Psychotherapy, PD Dr. Susanne Knappe, Institute of Clinical Psychology and Psychotherapy, and Dr. Ute Lewitzka of the "Werner-Felber-Institut für Suizidprävention und interdisziplinäre Forschung im Gesundheitswesen e.V." will receive €424,000 research funding for their project "NeSuD: Netzwerk für Suizidprävention in Dresden" (network for suicide prevention in Dresden). The project aims at expanding knowledge on psychological stress and suicidal tendencies of adolescents and young adults, creating awareness about professional (regional) support and helping overcome barriers in the care of people at risk of suicide. A regional and cross-sectoral network of low- to higher-threshold support structures for different target groups as well as a universal prevention measure for psychoeducation of pupils of 12 years and older will be offered. During the second part of the project, pupils aged 12 to 18 will directly be made aware of mental health and stress as well as support programmes. The aim is to reduce the stigma of psychological stress, crisis situations and emergencies and to improve the accessibility of professional support. The project is funded by the Federal Office of Administration for the duration of 36 months and applies to personnel and material costs.

AWARDS

"Physik-Preis Dresden" awarded for the second time

On 5th December 2017, the "Physik-Preis Dresden" of the TU Dresden and Max Planck Institute for the Physics of Complex Systems (MPI-PKS) was awarded for the second time. Award winner is the french physicist Prof. Jacques Prost, emeritus research director of the Centre national de la recherche scientifique at the Institute Curie in Paris. Prof. Prost received the prize for his scientific merits in the application of physics of non-equilibrium in diverse questions in the field of biology. Through his creative ideas he established new concepts for the research of biological systems and highlighted the role of physical principles in Biology. As a regular guest in Dresden, he

promoted the development of the Dresden biophysical community significantly and stimulated numerous research activities at the interface between physics and biology. The host of the evening, Prof. Roland Ketzmerick, Chairman of the Faculty of Physics of the TU Dresden, was delighted about the honour for such an important, international researcher. "I hope that the Dresden biophysics community will be able to continue their excellent co-operation with him." The "Physik-Preis Dresden" was endowed in 2015 by the Dresden physicist Prof. Peter Fulde, the founding director of the MPI-PKS. It distinguishes scientific excellence as central criteria and furthermore work, that is of significance for the cooperation between the Dresden-concept members MPI-PKS and TUD and strengthens connections in the long term.



From left: Prof. Frank Jülicher (MPI-PKS), award winner Prof. Jacques Prost and Prof. Roland Ketzmerick, Chairman of the Faculty of Physics. Copyright: Nicole Gierig

Outstanding commitment: Daidalos-coin for Dresden liaison lecturer Rudolf Entzeroth

Prof. Rudolf Entzeroth from the Faculty of Biology was awarded for his outstanding commitment as liaison lecturer on the 17th of November 2017 with the Daidalos-Silvercoin of the foundation "Studienstiftung des deutschen Volkes". Being liaison lecturer since 1999, Prof. Entzeroth not only supervised a group of scholarship holders from different fields, he coordinated the volunteer work of all liaison Professors in Dresden for over 10 years. He organised discussion evenings, visits to research facilities and excursions, in order to provide scholarship holders with a platform to meet and promote discussions. Furthermore, Dr. Annette Julius stressed in her appraisal Prof. Entzeroth's ability as a "critical observer of current affairs" to stimulate scholarship holders to take a stand regarding current developments and equally to foster tolerance as well as critical openness. The Daidalos-Silvercoin has been awarded by the board of the "Studienstiftung" to particularly committed liaison lecturers since 2013.

PROMOTING STUDENTS



On Cosmic Day, youths from Saxony researched cosmic particles at the Institute of Nuclear and Particle Physics. Copyright: Anne Feuerhack

Small particles, big correlation: youth research during the Cosmic Day

On the trail of the smallest particles in the universe: the November 30th marked the 6th International Cosmic Day! Together with numerous scientists from all over the world, 22 pupils from Saxony embarked on the exciting mission to research cosmic particles at the Institute of Nuclear and Particle Physics. Simple experiments answered central questions such as: Where do these particles come from? How are they accelerated to such high energy? How do they expand in space? Measuring cosmic particles helps us to draw conclusions about the origin of the universe. Amongst others, the "Netzwerk teilchenwelt" afforded adolescents insight into this research. This TU Dresden project opens up the world of quarks, electrons and similar particles, to pupils and is co-initiator of the international research-day. This year, 38 groups from 19 countries participated in similar research as conducted

in Dresden. Among them: Georgia, Great Britain, Columbia, Italy, Mexico, China, Ethiopia and the USA. Partaking pupils from all over the world shared their findings in a final video conference.

GOOD SCIENTIFIC PRACTICE

Dr. Michael Höfler heads subject "Good Scientific Practice" at the Faculty of Psychology

Dr. Michael Höfler, Faculty of Psychology, Chair of Clinical Psychology and Behavioural Neuroscience, is now in charge of courses and informative events on "good scientific practice". For questions or suggestions regarding the subject please contact him via email at michael.hoefler@tu-dresden.de or phone extension number -36921. Material will be provided on the website of the Faculty shortly.

REVIEW

Christmas network event of the Professors

The Christmas season thrives on proximity, exchange, togetherness – to start afresh with joint efforts in the new year: the ideal time to nurture old contacts and create new synergies in the School of Science as well. The second meeting of the School's professors took place on the 29th of November. Ideas between the faculties were exchanged amidst



Exchange and togetherness in a festive atmosphere: At the network event of the professors, ideas and suggestions for the new year were generated. Copyright: Prof. Jan J. Weigand

the scent of waffles and "Glühwein", with "self-made" violin and rock music. The colleagues enjoyed the atmosphere in the beautifully decorated Atrium of the new building of the Faculty of Biology until the late hours. Surrounded by modern laboratories, lecture halls and offices, all attendees had the opportunity to see the design and functionality of the building.

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