
Happy New Year

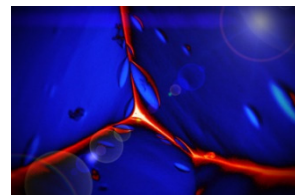


2019 in Review

Successful Collaborative Research Centres and UA Ruhr Professorship Strengthen Materials Sciences in the Ruhr Area

The Materials Chain, the largest flagship program initiated by the University Alliance Ruhr, can successfully look back on more than 1,300 publications from the field of materials science in 2019. As part of the BMBF's future cluster initiative, a cross-location proposal was successfully launched that focuses on the knowledge-based design of complex materials and systems for energy storage and conversion. A new Collaborative Research Centre was approved and another successfully extended.

Full UA Ruhr annual report with Materials Chain's review on page 5



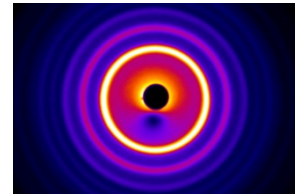
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Latest News

The Effect of the Hot Electron

You can't really see them, but you can still follow the flow of energy like in a flip book: Physicists from the University of Duisburg-Essen (UDE) have investigated the energy transfer in a metal insulator material and published their results in the journal "Physical Review B". In the long term, they could contribute to solving the heat problem in microelectronics through targeted material design.

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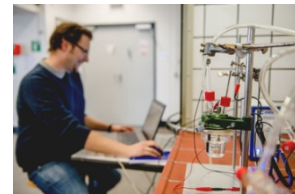


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Bioelectrocatalysis as Basis for the Energy Revolution

Biocatalysts are promising materials for the switch to renewable energies. But what works in the laboratory does not necessarily mean a breakthrough for industrial applications: a research team from the Center for Electrochemical Sciences (CES) at Ruhr Universität Bochum (RUB) discusses hurdles that have to be overcome in the journal Nature Catalysis from 25 November 2019, focusing on two main research fields:

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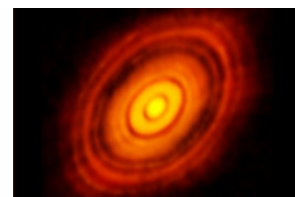


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From Dust Particle to Planet

Planets form in the rotating gas and dust cloud around a young star. Dust particles collide there and grow into huge boulders. Until now it was unclear how this can work. If the particles are a millimeter or more in size, they bounce off each other. Physicists from the University of Duisburg-Essen (UDE) seem to have solved the mystery. In experiments, they have shown that the colliding dust grains become electrically charged and therefore adhere to each other. Nature Physics reports on these findings in its current issue.

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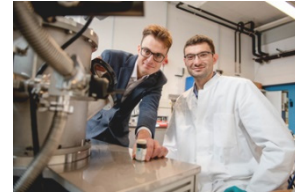


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New Shape Memory Alloy Developed at RUB

A research team from Interdisciplinary Centre for Advanced Materials Simulation (ICAMS) and the Institute for Materials (IFM) at Ruhr-Universität Bochum (RUB) developed a new shape memory alloy that returns to its original form for many times when heated. Using computer simulation, Alberto Ferrari (ICAMS) calculated a design proposal for a shape memory alloy that remains efficient for a long time even at high temperatures.

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New/Coordinated Projects

Sensor Sticker Monitors Food Production

Germs in the sausage factory - a horror scenario for manufacturers and consumers. In order to detect such and other disturbances of production processes in agriculture and the food industry at an early stage, researchers are developing smart sensor stickers in the "Smart (Bio)-sensors for the process industry" project, "Saber Print" for short. They can be fitted with various sensors and allow production processes to be monitored online.

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Extending STEM Views

Technical devices such as microscopes are essential for STEM subjects. In the zdi Student Laboratory at the University of Duisburg-Essen (UDE) young people will soon be able to experience how they work, using virtual augmented reality apps. The project is financed with 120,000 euros, half of which comes from the European Regional Development Fund, the other half from the zdi Student Laboratory and the Chair for Verteilte Systeme of Prof. Dr. Torben Weis.

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Nano Platinum for Neurological Implants

Normal movements without trembling or cramping - this is what brain pacemakers allow people with Parkinson's disease to do. High quality and long-term stability of the implanted electrodes are essential in order to minimize follow-up operations. To this end, researchers at the University of Duisburg-Essen (UDE) want to coat the implants with metal nanoparticles and thus improve the contact between implant and tissue. Dr. Brian Giera from the Livermore National Laboratory (USA), currently a Mercator Fellow at the UDE, is also involved.



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Awards (Congratulation!)

Bochum Team Wins Second Place with Machine Learning

With their algorithm for predicting material properties, Dr. Yury Lysogorskiy and Dr. Thomas Hammerschmidt from the Interdisciplinary Centre for Advanced Materials Simulation (ICAMS) at Ruhr-Universität Bochum (RUB) took second place in an international competition on machine learning.



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Events

Save the Date

3rd Materials Chain International Conference **MCIC 2020**

November 24 – 26, 2020 | UA Ruhr, Bochum, Germany



Publication Highlights

Topotactic Phase Transition Driving Memristive Behavior

Nallagatla, V.R. and Heisig, T. and Baeumer, C. and Feyer, V. and Jugovac, M. and Zamborlini, G. and Schneider, C.M. and Waser, R. and Kim, M. and Jung, C.U. and Dittmann, R.

Advanced Materials 31 (2019)

[more](#)

Role of Electron-Phonon Coupling in the Thermal Evolution of Bulk Rashba-Like Spin-Split Lead Halide Perovskites Exhibiting Dual-Band Photoluminescence

Steele, J.A. and Puech, P. and Monserrat, B. and Wu, B. and Yang, R.X. and Kirchartz, T. and Yuan, H. and Fleury, G. and Giovanni, D. and Fron, E. and Keshavarz, M. and Debroye, E. and Zhou, G. and Sum, T.C. and Walsh, A. and Hofk...

ACS Energy Letters 4 2205-2212 (2019)

[more](#)

Single entity electrochemistry for the elucidation of lithiation kinetics of TiO₂ particles in non-aqueous batteries

Löffler, T. and Clausmeyer, J. and Wilde, P. and Tschulik, K. and Schuhmann, W. and Ventosa, E.

Nano Energy 57 827-834 (2019)

[more](#)

[See all publications](#)

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