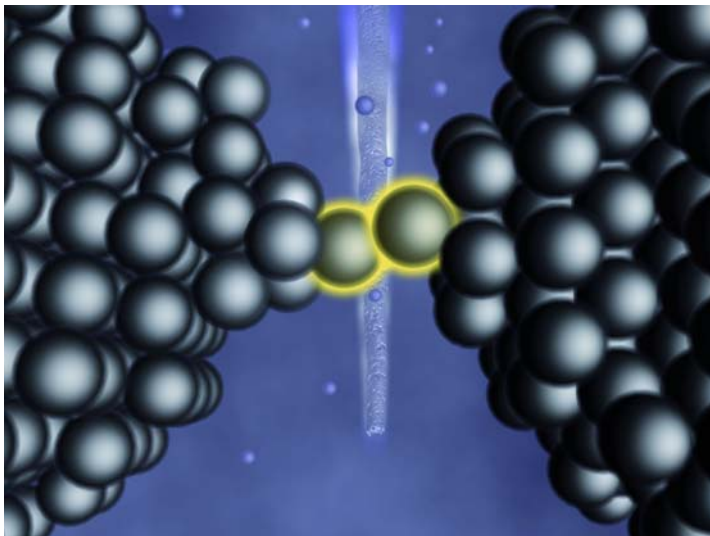


Nanomaterials in Focus

Bosch Group Finances Professorship for Nanostructured Functional Materials at KIT



Focus on viable technologies: KIT intensifies its research into the application of nanostructured functional materials. (Photo: Christian Gruppe)

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Functioning, stability, and reliability of nanomaterials and future nanoproducts are in the focus of a KIT professorship that is funded by the Bosch Group. Over a period of ten years, EUR 500,000 will be invested annually in scientific work relating to nanostructured functional materials. Research is aimed at developing concepts to use the scientifically observed effects of nanomaterials for materials science and engineering. Among others, future high-performance materials will be applied in photovoltaics and energy storage and conversion.

In the past two decades, nanotechnology has revealed many new effects of materials. Some of them might revolutionize existing technologies or give rise to entirely new technologies. To use these effects, viable new concepts have to be developed or existing technologies have to be miniaturized largely. This requires bridging the gap between fundamental research in natural sciences and materials engineering.

Electronic nano-effects from quantum mechanics and effects based on the small size of nano-objects are to be considered in combination with aspects of mechanical, thermodynamic, and structural stability, e.g. when using break junctions as sensors and applying nano-porous materials or nanostructured layers.

Funding of the professorship at the KIT Institute for Applied Materials is part of the new international initiative "Bosch Inter-Campus Program" launched on the occasion of the 125th anniversary of Bosch. Under this program, the Bosch Group will support universities and research projects in Germany, China, India, and the USA with a total of EUR 50 million in the next ten years.

Research will concentrate on the evaluation of nanostructured materials and future nano-products in terms of functioning, stability, and reliability rather than on their processing. First, mechanical properties of quasi one-dimensional structures are to be studied. They are essential when developing microelectromechanical systems (MEMS) further to nanoelectromechanical systems (NEMS). It is already possible to structure mono- and polycrystalline silicon by lithography in the range below 100 nm. In addition, one-dimensional metal and ceramic nanostructures (nanowires) and carbon nanotubes are available. However, many aspects of reliability are still unclear and will only be understood by consistent and systematic comparisons of experimental results with molecular dynamics simulations.

Karlsruhe Institute of Technology (KIT) is a public corporation according to the legislation of the state of Baden-Württemberg. It fulfills the mission of a university and the mission of a national research center of the Helmholtz Association. KIT focuses on a knowledge triangle that links the tasks of research, teaching, and innovation.

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