



MAPEX Bremen
Material. Process. Excellence.



SCIENCE & PROJECTS

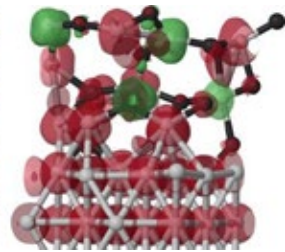
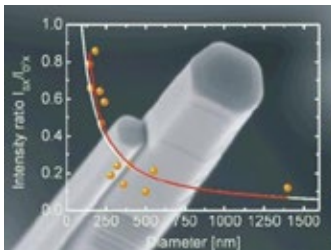
MAPEX mission and kick-off meeting



II MAPEX – MATERIAL, PROCESS, EXCELLENCE

The advancement of technology is intimately connected with the discovery of novel materials and the concomitant development of novel processes to manufacture tools and devices out of them. It has been so since the very beginning of humanity as we know it, in such a prominent way that materials classes are still used to name historical ages (stone, bronze, iron). For their part, synthesis and manufacturing processes have acquired at times mystical connotations, philosophers' stones and God-forged weapons being just prominent examples. In our post-Enlightenment age, mysticism has been replaced by knowledge and empiricism is increasingly giving space to rational, causality-driven design. What remains unchanged and unchallenged is the intertwined link between material and process, a link that nourishes the newly established MAPEX centre and tightly connects all of its seventy members. The consortium encompasses vast knowledge fields of natural and engineering sciences as well as mathematics. It covers the synthesis, characterization and modeling of advanced materials through all subsequent engineering technologies up to the fabrication of machine components with exquisitely tailored functional and structural properties.

The expertise of the participating members spans across a wide and diversified research landscape (see cover page of this newsletter). In the same way as pieces of a puzzle with their own distinctive colors assemble together to reveal a larger picture, the collaborative work performed by the MAPEX scientists contributes to gaining a thorough understanding of the relations and dependencies between materials and processes. Their system-oriented and concomitant development for sustainable transport and energy applications is our driving force. The accurate control of materials chemistry and microstructure at length scales ranging from picometers to meters; the steering of their properties during synthesis, processing and their lifetime usage is what we strive to achieve in our common journey.



J. Gutowski, Institute of Solid State Physics, Uni Bremen

U. Reiß, IWT

L. Colombi Ciacchi, Bremen Center for Computational Materials Science

Materials, Technologies, Methods – the three MAPEX competence areas exemplified by semiconductor nanowires, the heat treatment of a gear wheel and the simulated electronic structure of oxidised chromium (from left to right).

MAPEX comprises about 45 Principal Investigators (PI) and 25 Early Career Investigators (ECI) affiliated to five different University faculties and four external research institutes. Lucio Colombi Ciacchi represents the center as the speaker, with the support of the vice-speaker Ralf Bergmann and the scientific manager Hanna Lührs. Its central decision-making body is the Executive Board, consisting of ten PIs and two ECIs. A five-membered International Advisory Board guides the center with respect to its scientific development and worldwide visibility.

II MAPEX KICK-OFF MEETING 11 MAI 2015

The first public action of MAPEX was the plenary meeting held on 11th May 2015, where a total of 60 Principal Investigators, Early Career Investigators, and guests came together to catch up on MAPEX issues and get in touch with other scientists. The inspiring guest lecture of the coordinator of the cluster of excellence „Engineering of Advanced Materials“ at the Friedrich-Alexander-Universität Erlangen, Prof. Wolfgang Peukert, was a highlight of the meeting. Presentations from all DFG-funded, coordinated research programs within MAPEX completed the program: two Collaborative Research Centers (*Sonderforschungsbereiche*) are the tangible proof of excellent research within the high-profile area. Further results of close collaborations comprise three Research Units (*Forschergruppen*), two Priority Programs (*Schwerpunktprogramme*) and one Research Training Group (*Graduiertenkolleg*).



MAPEX speaker Lucio Colombi Ciacchi presenting the MAPEX milestones.



Wolfgang Peukert, Friedrich-Alexander-Universität Erlangen.