COST Strategic Workshop

Principles and Development of Bio-Inspired Materials

Vienna, Austria: 13-15 April 2010

Aims and Background of Strategic Workshop on Bio-Inspired Materials
Bio-inspired materials are becoming of increasing interest in many fields of practical applications. In contrast to man-made materials natural materials such as wood, bone and shell are composed of only limited number of basic components. They gain their diversity in mechanical properties by hierarchical structuring and functionalising of surfaces and interfaces. This allows them to fulfil and to combine a variety of mechanical and additional functions, e.g. combining high stiffness and toughness, benign fracture behaviour, self-healing, self-adaptability, optical functions, etc. Due to the quickly advancing physical and chemical characterisation techniques our knowledge of natural structures and materials has increased significantly in recent years and the secrets of form-structure-function relationships are slowly unveiled. New simulation and production methods allow for the first time to structure technical materials similar to the biological templates. But combining the knowledge of natural materials with modern techniques of simulation and the fabrication of smart technical materials is still the exception due to the lack of communication between bio- and engineering- and material scientists.
In order to close this gap, a Strategic Workshop promoted by COST, was believed as most suitable. High-ranking representatives of natural science, medicine and industry were invited to report on the latest state of knowledge and young researchers were asked to participate not only, but also to present their own work in posters.

With this, the objectives of the workshop were defined as
- Researchers and decision makers from different disciplines, like Biology, Physics, Chemistry, Materials Science, Medicine, Biomimetics and interdisciplinary fields, should discuss forefront topics, which can be used in the future development of bio-inspired materials.
- They should explore the state of knowledge and identify present lack of knowledge as well as demands on specified properties of new materials. They should identify new and promising technologies to develop new bio-inspired materials.
- The Strategic Workshop should figure out needs for interdisciplinary research and try to bundle and promote multidisciplinary scientific cooperation in these fields.

Following forefront topics were identified
- What are the main topics of today´s research on bio-based materials in the different European countries and research groups?
- Which demands on special properties of materials exist? Which developments seem promising using nature as a teacher and thus developing bio-inspired materials?
- Which research institutions should cooperate and exchange knowledge, ideas, as well as equipment?

As an outcome, the strategic workshop should
- raise the political awareness of the potential of bio-inspired materials
- raise the cooperation at the European level
- lead to more COST Actions – besides the already approved one with the same title – and they should be implemented in other than the MPNS (Materials, Physical and Nanosciences) Domains of COST.
- promote research and cooperation in the field of bio-inspired materials in Europe.

The workshop has been organized along four main themes
- Overview on existing activities on bio-inspired materials
- Properties and characterization of natural materials and strategies of nature
- Man-made bio-inspired materials - abstraction and translation
- Applications - optimized materials and structures and future demands

Conference organisers
- BOKU – University of Natural Resources and Applied Life Sciences

Department of Materials Sciences and Process Engineering
Institute of Physics and Materials Science
- COST – European cooperation in the field of scientific and technical research

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Sponsors
- COST (European cooperation in the field of scientific and technical research)
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Local Organizer & Contact

Universität für Bodenkultur Wien
Department für Materialwissenschaften und Prozesstechnik
Institut für Physik und Materialwissenschaft
Univ.Prof.in Dr.in Stefanie Tschegg
Peter-Jordan-Straße 82
1190 Wien
Tel: +43 1 47654-5160
Fax: +43 1 47654-5159
biomat@boku.ac.at

Information: http://www.map.boku.ac.at/workshopbiomat.html

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