



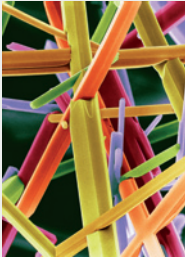
**E**UROPEAN  
**S**CIENCE  
**F**OUNDATION

**Expert Committee**  
**Materials Science and Engineering**  
**Expert Committee** MatSEEC

# Expert Committee

## Materials Science and Engineering

### Expert Committee



Caffeine crystals  
Coloured scanning electron micrograph (SEM) of anhydrous caffeine crystals (1,3,7-trimethylxanthine). They were produced by a process called sublimation.  
Magnification:  $\times 400$  at 10 centimetres high.

© Dr. Jeremy Bruggess/  
Science Photo Library/Cosmos

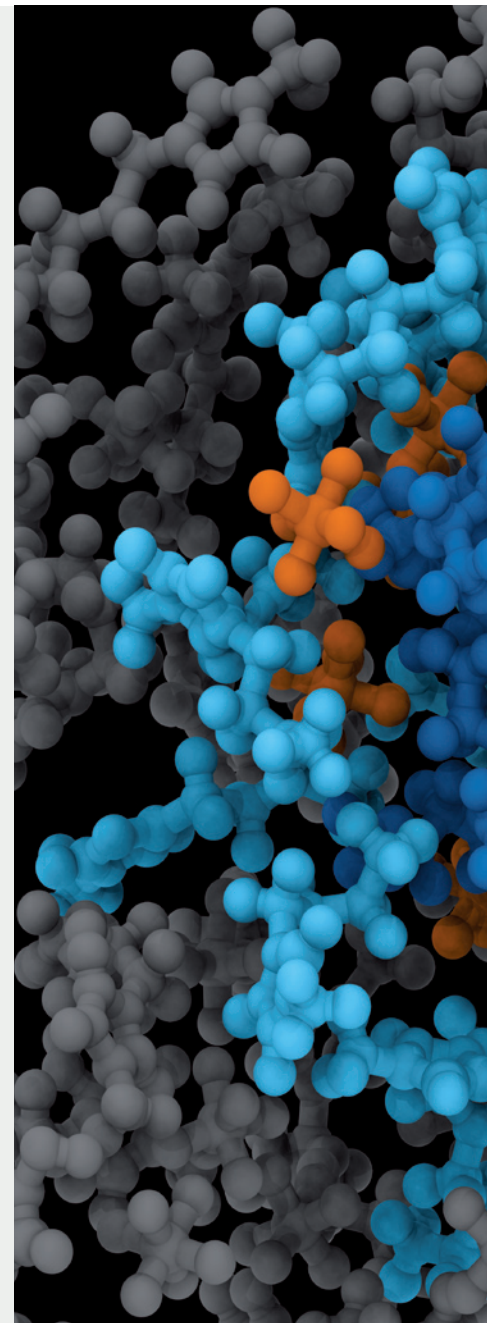
### What is the Materials Science and Engineering Expert Committee?

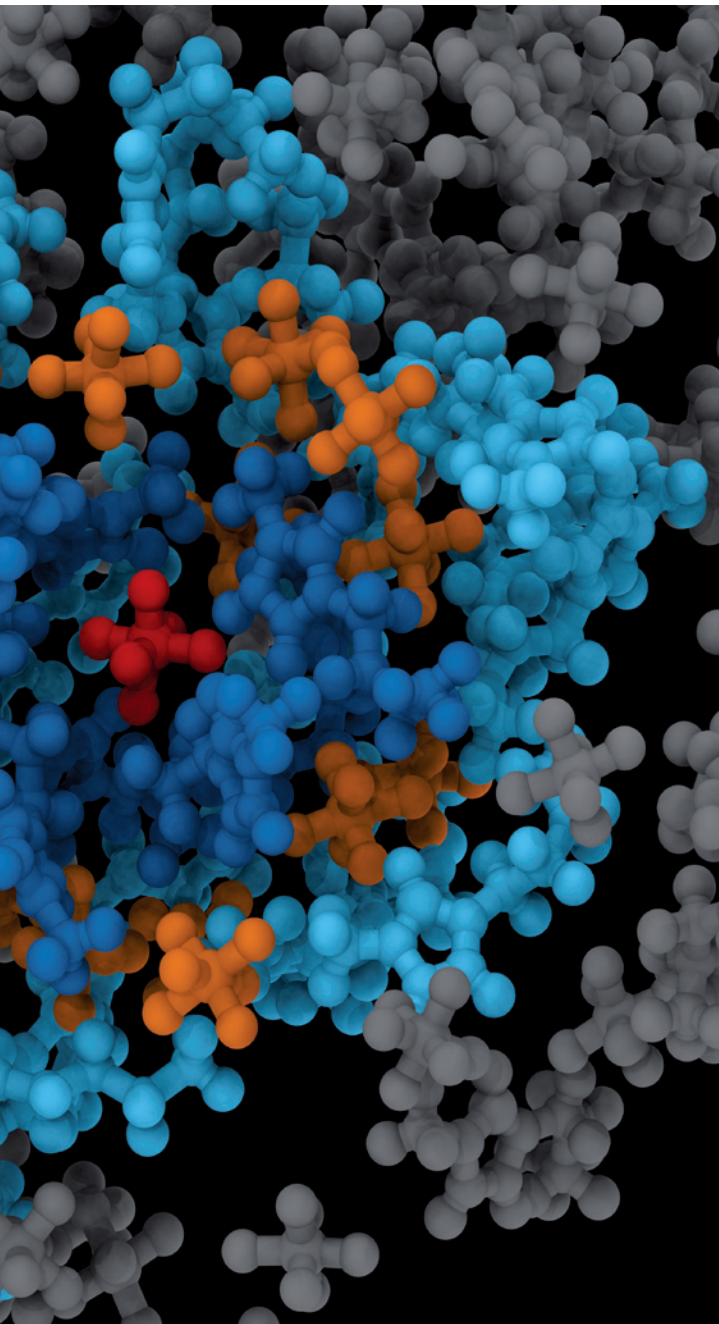
Following thorough discussions with major stakeholders about the needs and future opportunities for materials science and engineering research in Europe, the European Science Foundation (ESF) established a new Materials Science and Engineering Expert Committee (MatSEEC) in October 2009. MatSEEC operates as an ESF Expert Committee within the remit of the Standing Committee for Physical and Engineering Sciences (PESC) with a term of five years.

The aim of MatSEEC is to enhance the visibility and value of materials science and engineering in Europe, to help define new strategic goals, and evaluate options and perspectives covering all aspects of the field.

MatSEEC is an independent science-based committee of over 20 experts active in materials science and its applications, materials engineering and technologies and related fields of science and research management. Committee members are nominated by the member institutions and they maintain strong links with their nominating organisations and their respective scientific communities.

*MatSEEC is an Expert Committee of the European Science Foundation (ESF). The ESF is an independent organisation, owned by 78 Member Organisations among which are funding organisations and research performing organisations, academies and learned societies from 30 countries. ESF promotes collaboration in research itself, in the funding of research and in science policy activities at the European level.*





### 3 Materials Science and Engineering Expert Committee

#### MatSEEC mission

The main task of MatSEEC is to deliver strategic advice to PESC and ESF on issues related to materials science and engineering. It also gives independent expert opinion and policy advice on matters of concern to European national agencies and ministries, institutions of the European Commission and the European Strategic Forum on Research Infrastructures (ESFRI) as well as to the related scientific communities.

MatSEEC's mission also includes tasks related to peer review and assessment of scientific research proposals. The Committee may conduct surveys in order to prepare strategic policy documents.

Thus, tasks of MatSEEC include:

- Producing **scientific forecasts** on future challenges to materials science and engineering and related research activities, describing the next generation of demands on materials science and engineering and applied fields, and advising on new requirements for educational standards in academic training as they arise.
- Providing **strategic and scientific policy advice** to PESC, ESF Member Organisations and European bodies based on identified strengths and weaknesses, assessments of relevant research infrastructures and best practices.
- Delivering **scientific assessments** on recent research results and current scientific and technological developments including best practice for technology transfer, potential for innovation and development of academic and industrial partnerships.

Structure of a room-temperature ionic liquid. The strong Coulomb interaction between the ions leads to the formation of concentric shells of anions (in red and orange) and cations (light and dark blue). This long-ranged structure in the liquid affects the performance of this new class of materials, leading to high viscosity and low ionic conductivity.

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## **Main activities**

MatSEEC has identified its priority topics for the future of research in the field of materials science and engineering. The work of the Committee is structured around working groups covering the following areas:

### **Future Materials and Challenges**

The working group has a task of defining future trends in materials by means of structured foresight methodologies aimed at providing recommendations for research directions for the 5-15-year time span.

### **Tools, Facilities and Infrastructures**

The working group is preparing a survey on small and medium-sized research infrastructure for materials. This work is being coordinated with that of the ESF Member Organisation Forum on Research Infrastructures and the recently started MERIL (Mapping of the European Research Infrastructure Landscape) project. The group also aims to establish an inventory of equipment used for

materials science and engineering research in Europe. The data collected will serve to assess the strengths and weaknesses of the European research landscape in the field, and develop recommendations for future needs together with the working group Materials and Challenges.

### **Computational Techniques, Methods and Materials Design**

Drawing on the background work of the ESF Forward Look *European Computational Science: from Computers to Scientific Excellence* and several Research Networking Programmes, the working group is providing recommendations on strengthening computational techniques, methods and materials design in Europe.

### **Technology and Knowledge Transfer**

The complex issue of technology and knowledge transfer in Europe is addressed from the perspective of materials science and engineering by taking into account the specific issues relating to the field. The focus

is on providing recommendations to enable more efficient transfer of technology and innovation from academia to various industrial sectors dealing with materials. A broad consultation with experts from industry, lawyers and intellectual property specialists will help to achieve this objective.

### **What kind of Funding?**

The working group has identified the establishment of efficient mechanisms for funding ‘bottom-up’ cross-border collaborative research as one of its priorities for action. The needs and trends in funding are discussed with national and European funding organisations in order to provide recommendations.

### **Education and Training**

Materials science and engineering requires interdisciplinary education and training. The aim of the working group is to reflect upon drawbacks and best practice in European academic curricula and provide recommendations for achieving excellence and promoting transfer of knowledge in the field.

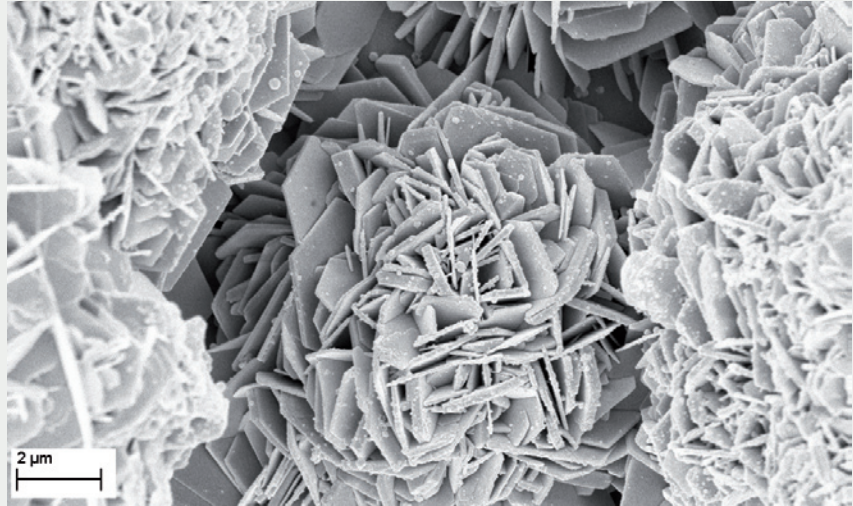
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Right:  
Image obtained on a high resolution scanning electron microscope showing a nanostructured zinc oxide flower structure

© Dr Martyn A McLachlan

Below:  
Low-temperature thin-film hydrogenated amorphous silicon bulk MEMS resonator on a glass substrate.

© Courtesy of INESC-MN, Lisbon, Portugal

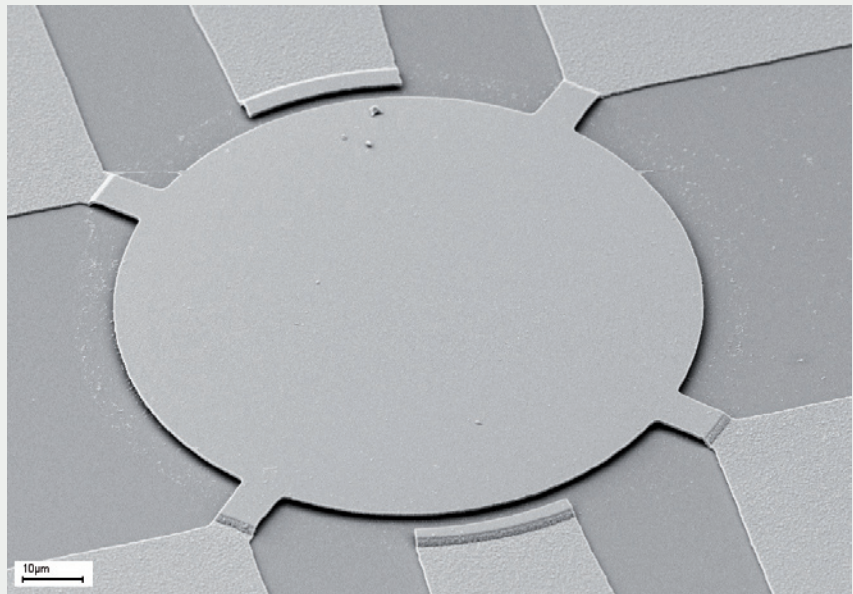


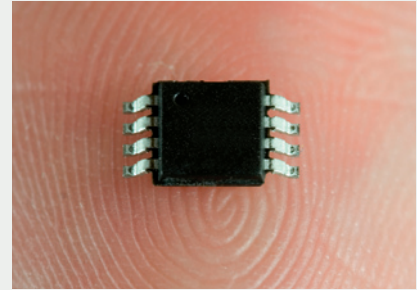
### Public Outreach and Visibility

The aim of this working group is to enhance the visibility of the materials science and engineering field by active promotion of its activities among the scientific community and stakeholders by means of publications, conferences and networking.

### Materials for Key Enabling Technologies

An *ad-hoc* working group was set up within the Committee in July 2010 to respond to a request for providing input to the European Commission's High Level Group on Key Enabling Technologies, jointly with the European Materials Research Society (E-MRS). MatSEEC has prepared a common document with E-MRS with contributions and recommendations in the areas of nanotechnology, advanced materials, micro- and nanoelectronics, biotechnology and energy.





## MatSEEC membership

- **Professor Günther Bauer (Chair)**,  
Institut für Halbleiter- und Festkörperphysik, University of Linz, Austria
- **Professor Neil Alford**,  
London Centre for Nanotechnology, Department of Materials, Imperial College London, United Kingdom
- **Dr Patrick Bressler**,  
Director, Brussels Office, Fraunhofer Gesellschaft, Brussels, Belgium
- **Professor Anne Borg**,  
Department of Physics, Institutt for Fysikk, Norwegian University of Science and Technology, Trondheim, Norway
- **Professor Joao Pedro Conde**,  
Department of Chemical and Biological Engineering, Instituto Superior Tecnico, Technical University of Lisbon, Portugal
- **Dr Urs Dürig**,  
Zürich Research Laboratory, IBM Research GmbH, Rüschlikon, Switzerland
- **Professor Agustin R. Gonzalez-Elipe**,  
Consejo Superior de Investigaciones Científicas (CSIC), Instituto de Ciencia de Materiales de Sevilla, Spain
- **Professor Hermann Grimmeiss**,  
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- **Dr David J. Jarvis**,  
European Space Agency, ESTEC-GAP, Noordwijk, The Netherlands
- **Professor Anke Rita Kaysser-Pyzalla**,  
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- **Professor Roberto Lazzaroni**,  
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- **Dr Frank Luděk**,  
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- **Professor Risto Nieminen**,  
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- **Professor Eva Olsson**,  
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- **Professor Anne-Christine Ritschkoff**,  
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- **Professor Robert Singer**,  
Head, Institute of Science and Technology of Metals, University of Erlangen-Nürnberg, Germany
- **Dr Constantin Vahlas**,  
Centre Interuniversitaire de Recherche et d'Ingénierie des Matériaux (CIRIMAT), Toulouse, France
- **Professor Paul Van Houtte**,  
Department of Metallurgy and Materials Engineering, Faculty of Engineering, Katholieke Universiteit of Leuven, Heverlee, Belgium

## MatSEEC funding organisations

### Observers:

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(European Commission),  
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– Materials, Research Directorate-  
General, European Commission
- **Dr Renzo Tomellini**  
(European Commission),  
Research DG RTD G3 “Materials” –  
Industrial Technologies, European  
Commission
- **Professor Hans Jörg Fecht**  
(European Space Sciences Committee  
– ESSC), Institute of Micro and  
Nanomaterials, Faculty of Engineering  
and Computer Sciences, Ulm  
University, Germany
- **Fonds zur Förderung der  
wissenschaftlichen Forschung  
in Österreich (FWF)**  
*Austrian Science Fund, Austria*
- **Fonds de la Recherche Scientifique  
(FNRS)**  
*Fund for Scientific Research, Belgium*
- **Fonds voor Wetenschappelijk  
Onderzoek-Vlaanderen (FWO)**  
*Research Foundation Flanders,  
Belgium*
- **Akademie věd České republiky  
(ASCR)**  
*Academy of Sciences of the Czech  
Republic*
- **European Materials Forum (EMF)**
- **European Materials Research  
Society (E-MRS)**
- **European Space Agency (ESA)**
- **Suomen Akatemia/Finlands Akademi**  
*Academy of Finland, Finland*
- **Tiedeakatemiajaosto/Sektionen  
för Vetenskapsakademierna**  
*Delegation of the Finnish Academies  
of Science and Letters, Finland*
- **Centre National de la Recherche  
Scientifique (CNRS)**  
*National Centre for Scientific Research,  
France*
- **Deutsche Forschungsgemeinschaft  
(DFG)**  
*German Research Foundation,  
Germany*
- **Helmholtz-Gemeinschaft Deutscher  
Forschungszentren (HGF)/  
Helmholtz Zentrum Berlin**  
*Helmholtz Association of German  
Research Centres, Germany*
- **Max-Planck-Gesellschaft (MPG)**  
*Max Planck Society, Germany*
- **Fraunhofer Gesellschaft, Germany**
- **Consiglio Nazionale delle Ricerche  
(CNR)**  
*National Research Council, Italy*
- **Norges Forskningsråd**  
*Research Council of Norway, Norway*
- **Polska Akademia Nauk (PAN)**  
*Polish Academy of Sciences, Poland*
- **Fundação para a Ciência e  
a Tecnologia (FCT)**  
*Foundation for Science and  
Technology, Portugal*
- **Slovenska Akademija Znanosti  
in Umetnosti (SAZU)**  
*Slovenian Academy of Sciences and  
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- **Consejo Superior de Investigaciones  
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*Council for Scientific Research, Spain*
- **Vetenskapsrådet (VR)**  
*Swedish Research Council, Sweden*
- **Schweizerischer Nationalfonds (SNF)**  
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