



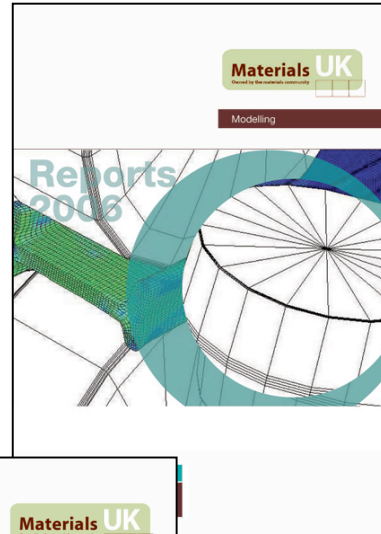
***Materials UK 2007
Science & Technology***

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Materials Innovation & Growth Team - Science & Technology Task Force





Materials Innovation & Growth Team - Science & Technology Task Force

Recommendations:

- *The UK must develop a National Materials Network for efficient & effective use of its asset base.*
- *Continuity of Funding is essential if Materials Innovation is to be nurtured and brought to fruition.*
 - *SBIR, DARPA and Procurement*
- *Materials for Energy must be a priority for R&D Funding*



Materials for Energy

Energy	Plant/ components	Structural Materials	Functional Materials	Multifunctional Materials	Biomaterials
Generation <i>Conventional and advanced fossil</i>	e.g. Steam turbines Boilers Gas turbines Gasifiers Fuel cells Hydrogen from coal Coal liquefaction	Steels Alloy steels Superalloys Ceramics Composites Coatings	Activated carbons Filters Interconnectors Membranes Sorbents Chemical looping materials	Structural health monitoring systems Diagnostic Smart materials Catalytic filter materials	Anti-corrosion biofilms
Generation <i>Nuclear</i>	e.g. Boilers & turbines Decommissioning/ storage Reactor vessels Fission/fusion materials	Steels Alloy steels Superalloys Ceramics Composites Coatings	Filters, Active carbons	Structural health monitoring Materials for remote robots Self-repair materials SMART materials	
Generation <i>Renewable</i>	e.g. Wind turbines Tidal power Hydro turbines Biomass plant Heat exchangers Fuel cells	Composites Polymers Steels Superalloys Ceramics Coatings	Photovoltaic Thermal materials (Geo and Solar) Fuel-cells materials Anti-fouling coatings	Photovoltaic materials Piezoelectrics Fuel-cell materials Catalytic Filters Conducting membranes Solid Electrolytes Thermoelectrics Power harvesting Structural health monitoring SMART actuation materials	Biofuels Biomimetic structures Biohybrid materials Anti-corrosion biofilms
Transmission	e.g. High conductivity applications Insulators High Strength	Ceramics Polymers Composites	Piezoelectric materials Superconductors		
Storage <i>Electrical</i>	e.g. Batteries	Ceramics Non-ferrous alloys	Electrode materials	Electrolytes Materials for integrated power systems	
Storage <i>Hydrogen</i>	e.g. Pipelines Compressors Pressure Vessels	Steels Alloy steels	Carbon Nanostructures Activated carbon membranes	High capacity/integrity	
Conservation	e.g. Lightweight structures Thermal insulation	Composites Ceramics	Photochromics Electrochromics Thermochromics	Smart packaging Insulation Energy harvesting	Biodegradation



Materials for Sensors & Diagnostics

Sector	Structural Materials	Functional Materials	Multifunctional Materials	Biomaterials
Healthcare	Implant wear / prosthetics	Telemedicine/ robot surgery Body signs	Health monitoring 'wearables' Remote sensing Biocompatible materials Compatibility	Assays Drug delivery systems Intelligent Implants
Energy	Fuel cells	Fuel cells	Fuel cells	Waste management
Construction	Lifetime measurement	Concrete ageing	Structural health monitoring/ diagnostics	Microbial hazards
Transport	Composite monitoring	Heat, pressure, wear Asset management Proximity alarms	Integrated sensors/ actuators Self-diagnostics	Driver alertness Environment quality
Retail		Produce lifetime Stock management	Smart packaging Sports equipment Product Tagging Printable power	Antifouling Biosensing
Communications	Asset management – proactive fault reporting	Magnetic Optical Network security		Biomimetic networks
Security	Structural/building management – earthquake sensors	Smoke detection Gas detection Identification	Anti-counterfeiting Offender tagging Biometrics	Biometrics Biohazard detection



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Recommendations:

- *Sensors & Diagnostics have been identified as a critical growth area and materials are fundamental to their development and applications.*
- *The holistic modeling of Materials on length and timescales facilitates the development of new materials & processes in a timely and more cost effective manner.*



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Recommendations:

- A sustainable, long term strategy for structural materials is essential for the well being of UK industry and academia.*
- Multifunctional materials demand investment in both basic and applied research.*
- Support for biomaterials is essential particularly for the development and refinement of bioresorbable and bioactive materials as a healthcare priority.*



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Recommendations:

- *Nanotechnology must be further supported to drive innovation through to industrial exploitation.*
- *The engagement between designers and materials technologists must be facilitated to encourage exchange of information leading to new and innovative applications of materials.*



Materials UK Science & Technology Task Force

The Way Forward:

- *One meeting of the S&T Committee*
New task groups needs to be formed
 - *The Vice-Chairman will form a small group to select people on the basis of their technical area.*
- *There have been 2 Community Meetings of S&T for MatsUK*
 - *A questionnaire has been completed and is being analysed*
- *We will consult more widely via Materials World and the web-site*
- *A new work programme is in the process of being developed.*
- *There are actions from the IGT report on Key Performance Indicators that S&T are required to complete by a specific time.*



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- *S&T Working Group to publish the reports produced by the Task Group and continue its work highlighting priority topics in underpinning materials technology for the Technology Strategy Board and Research Councils by October 2006 for the 2007 calls for proposals*
- *S&T Group to work with the Energy Group to construct a proposal for an Energy Materials Technology Platform by end of October 2006.*
- *Deliver a standard methodology for life cycle and design for life concepts and factual data for materials within a sustainable production and consumption agenda via the KTN nodes and Property Validation Centre by end of December 2006.*



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- *Materials Assets Connect formally launched by end of December 2006*
- *Produce or update existing foresight technology and research road maps that identify technology or research themes to support UK industry every two years.*
- *Produce at least one state of the art review per year on developments within each key technology area.*
- *Coordinate International activities on behalf of Materials UK.*



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- *Town Meeting (over 60 attendees) in December 06 covered 3 topics:*
- *Materials for Sensing and Diagnostics – led by Dr Markys Cain, NPL*
- *Structural Materials – led by Dr Martin Marples, NAMTEC*
- *Materials Hot Topics*
- *Through Life Cycle Modelling – meeting to be held before Spring 2007*



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- *Materials Hot Topics*
 - *Polymers meets electronics meets bionanotechnology*
 - *Creative industries*
 - *Pharmaceuticals*
 - *Genomics, nanostructure robotics*
 - *Extract new materials from the sea*
 - *Nanomaterials, food, taste, texture*
 - *Regenerative Medicine*
 - *Superconducting materials*
 - *Materials for energy*



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Materials Hot Topics (continued)

- *Scale up/ scale out issues*
- *Materials process modelling*
- *Characterization*
- *Materials designed to order*
- *Molecular materials*
- *Manufacturing*
- *New construction materials*
- *Security*



Materials UK
Science & Technology Task Force

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