

Structural materials in energy

Survey answers

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Business from technology

Survey background

- Find out the current status of structural materials science and technology research in different institutions
 - Collaboration
 - Promotion of structural materials technologies
- Four different surveys
 - Starting from **Structural materials in energy**
 - Structural materials in built infrastructure
 - Structural materials in transportation
 - Structural materials in energy efficiency

Structural Materials in Energy Field

Structural materials - definition for the survey

- Load-bearing materials, which maintain safety
- Materials under operation stress (mechanical load, chemical stress)
- Also manufacturing, joining and coating of structural materials
- And nanotechnology and other advanced material technologies in structural materials

Questions concerning structural materials in

- Cleaner combustion processes
- Wind energy
- Solar energy
- Fuel cells
- Bioenergy
- Nuclear energy
- Safety and reliability

Survey questions – Wind energy as an example

- How would you describe **current status** of structural materials and their research in wind energy technology?
- What are the **main activities** you have on wind energy technologies (point out 1-3 most important concerning structural materials)?
 - a) basic research
 - b) applied research projects
- What are the **challenges** for MSE (Materials and Science Engineering) in this field (point out 1-3 most important concerning structural materials)?
 - a) short term (1-3 years)
 - b) medium term (5-10 years)
 - c) long term (20-30 years)
- How do you see the **development** of materials research of this area **in your organisation** in future (resources in research and education, e.g. facilities, equipment, students, experienced lecturers and professors)?
- What kind of **co-operation** do you have **with industry** on this specific area?
- **Future trends** of this technology in relation to MSE and industry?
- Are there any **limitations** for the research and development in wind energy technologies (availability, price of raw materials, etc.)?

Structural materials in energy – survey background

Answer activity

- Answers 12/50 (24 %)

Countries

- Europe 4: Germany, Poland, Spain, Finland
- Asia 7: China, India, Japan, Korea, Thailand
- Australia 1
- America 0

Size of the institute

- Average personnel 993 (40...2700)
- Materials research personnel ave. 263 (40...700)

Profession

- Researcher 4
- Professor 4
- Director 2
- Vice-director 1
- Marketing head 1

Research activity in main topics

- Cleaner combustion processes 7
- Wind energy 4
- Solar 2
- Fuel cells 3
- Bioenergy 4
- Nuclear energy 5
- Safety and reliability 6

Summary of the survey

Research topics among the institutes

- Most research activity was carried out on cleaner combustion technologies, safety and reliability, and nuclear energy

Important research and development areas

- New materials development, joining, manufacturing
- Material degradation and life-time prediction: testing, monitoring, modeling
- New technologies: Gen IV, fusion, intermediate temperature fuel cells

Future of structural materials in energy field

- Research of structural materials was seen very important and as exciting force for different energy forms

Co-operation

- Co-operation between different institutes was surprisingly slight (1...27, median 2)
- Need for shared test facilities and lack of standardization was seen on wind energy research

Quality personnel

- Lack of future experts was seen as threat especially on cleaner combustion technologies and nuclear energy



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