On Advanced Materials Standards development

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Expert duties
• Chair of ISO TC229 (Nanotechnologies)
• Expert on ISO TC24/SC4 (Particle Characterisation)
• Expert on ISO TC281 (Fine Bubble Technology)
• Expert on CEN TC352 (Nanotechnologies)

Positions of responsibility
• Director and Founder of BREC Solutions limited and Global BREC Expert Network
• Board member of Nanotechnology World Network
Disclaimer

Some views and data presented during this talk are my own and do not represent an official ISO position.
Overview

• What are they?
• How could we define them?
• Consensus and standards
• Guideline repurposing
• Sustainability
• Safety Concerns
• Political interest
• Restrictions
What we may understand by Advanced Materials

Nanomaterials that are not Advanced (e.g., carbon black)

Advanced nanomaterials (also could be similar to engineered nanomaterials)

All materials

Nanomaterials

Advanced Materials

Advanced Materials that are not nano
Industrial take on AdMat

• These are the industries that use the term Advanced Materials at present:
  – High strength & toughness computationally designed alloys
  – Industrial ceramics
  – Super strength fibers
  – High temperature and high strength polymers
  – Nanomaterials (but not all)
What are the amounts?

<table>
<thead>
<tr>
<th>Material</th>
<th>Annual Use</th>
</tr>
</thead>
<tbody>
<tr>
<td>All Advanced Materials</td>
<td>Approx 500 Bn USD</td>
</tr>
<tr>
<td>Advanced Alloys</td>
<td>~150 Bn USD</td>
</tr>
<tr>
<td>Advanced Ceramics</td>
<td>~12 Bn USD</td>
</tr>
<tr>
<td>Advanced Fibres</td>
<td>~24 Bn USD</td>
</tr>
<tr>
<td>Advanced Polymers</td>
<td>~20 Bn USD</td>
</tr>
<tr>
<td>Nanomaterials</td>
<td>~16 Bn USD</td>
</tr>
</tbody>
</table>
Here we really mean a “documentary standard”

- Standards represent current the best practice
- Standards are made by consensus of all stakeholders (countries and organisations)
- Standards allow compatibility and comparison of products, materials and services
- Safety standards for products facilitate consumer acceptance
- While it may seem costly to comply at first, businesses save a lot of time and money in the long run
Guideline repurposing

• Depending on our understanding of AdMat some of existing
  – Expert groups
  – Committees
  – Guidelines
  – Standards
Could be re-used from Nano to AdMat with little adjustment.
Sustainability

• There is a great interest in Sustainability of Nanomaterials.
  – A bit too early to make a conclusion
  – A bit too broad an area to draw the same conclusions

• For AdMat we will have bigger problem drawing conclusions due to breadth of the area and processes involved.
Safety Concerns

• History repeats itself with AdMat
• Safety concerns are attached to the term and definition rather than real life safety data.
• What about Safer-by-Design?
• Are we asking “Nanotoxicologists” to become “AdMatoxicologists”?
Political Interest

- WEF identified AdMat in their Global Reset map
- Various national funding initiatives not for “nano” but for “AdMat”
- EC shifted interest from “Nanomaterials” to “AdMat”
Restrictions

• By using a term like “Advanced Materials” we run into a few restrictions:
  – Country ban on exports
  – Strategic consideration for funding and funding allocation
  – Dual use considerations
Conclusions

• If we are to move forward we need a certain consensus about
  – What they are
  – What they do
  – How they do it
  – What we need to use them safely

• There are also adverse effects of using a “catch all” term like AdMat