THE NATIONAL ACADEMIES
Advisers to the Nation on Science, Engineering, and Medicine

Materials for Manufacturing

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Director

National Materials Advisory Board

Board on Manufacturing and Engineering Design

Board on Infrastructure and the Constructed Environment

National Academies

- Purpose
  - To advance science and technology
  - To advise government
    - On policy institutions for science, engineering and health care
    - On applications of science and engineering to policy
  - We do this mainly through meetings and the development of conclusions and recommendations via NRC reports

"… shall, whenever called upon by any department of the Government, investigate, examine, experiment, and report upon any subject of science or art …"
↕National Academies Charter, Section 3 – March 3, 1863

A (very) short history

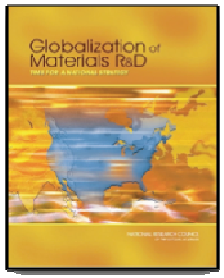
- 1863 National Academy of Science incorporated (charter signed by Lincoln)
- 1916 National Research Council established as a wartime effort
  - *In 1941, responding to a request by Vannever Bush, the National Academy of Science and National Research Council stood up the War Metallurgical Committee.*
  - *In 1951 the Metallurgical Advisory Board was established from the War Metallurgical Committee. This is the first iteration of the National Materials Advisory Board.*
- 1964 National Academy of Engineering established under NAS auspices
  - *1968 final name change to the National Materials Advisory Board*
- 1970 Institute Of Medicine established under NAS auspices

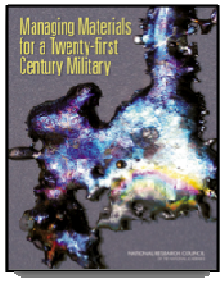
Methods of operation

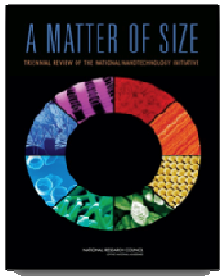
- Consensus Studies
  - Balance and Composition of Committees
  - Committee consensus on report
  - External review of report
- Convening Activities
  - Workshops
  - Standing Committees
  - Roundtables

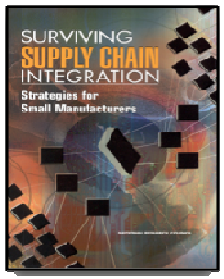
Materials, Manufacturing and Infrastructure

- At the National Academies, my boards are basically enabling boards with the following expertises
  - The National Materials Advisory Board (NMAB)
    - Materials engineering and materials science
    - Materials Education
    - Materials processing and processes
    - Materials applications
  - The Board on Manufacturing and Engineering Design (BMED)
    - Manufacturing
    - Systems engineering
    - Product supply chain
    - Engineering design
  - The Board on Infrastructure and the Constructed Environment (BICE)
    - The built environment
    - National through local infrastructure issues
    - DOD infrastructure issues
    - Issues dealing with constructed and natural environments.
    - Interaction of environments with human activities
- We are also working to develop common issues amongst these three boards – which is where an issue like rare earth availability in the supply chain lies.









Previous studies

- Globalization of Materials R&D: Time for a National Strategy (2005)
- Managing Materials for a Twenty First Century Military (2008 – also known as “the Stockpile Report”)
- A Matter of Size: Triennial Review of the National Nanotechnology Initiative (2006)
- Surviving Supply Chain Integration: Strategies for Small Manufacturers (2000)

Materials Availability for Manufacturing – Supply Chain Resiliency

- Discussions like TREM, the October GUIRR meeting and Minerals for a Green Society are developing Washington legs to a very important issue.
- My boards would like very much to help develop this issue further via an NAS workshop with recommendations
- We'd like to do this soon (within the next 6 months)

Statement of Task

- For this workshop we'd like to examine
  - Materials bottlenecks
    - What are the major issues of extraction and beneficiation that should be developed in the immediate and near future?
  - Materials Availability
    - What materials are we most concerned about losing or not having a sufficient amount of in the immediate and near future?
    - What strategies are being suggested for dealing with this issue?
  - Global materials supply chains
    - Where are the key US dependencies and what strategies are available for risk mitigation?
  - Path forward
    - Short term strategy for quick action.
    - Future studies necessary to help alleviate some of these problems.