
Workshop on “Combinatorial Approaches to Functional Materials”

May 5-6, 2014 San Francisco, CA



Thanks to..

- Charina Choi, Tom Kalil (*OSTP*)
- Ajey M. Joshi, Shannon Sullivan, Nag Patibandla (*Applied Materials*)
- Jason Hattrick-Simpers (*University of South Carolina*)
- Andrey Dobrynin (*NSF*)
- Ichiro Takeuchi (*University of Maryland*)
- Stefano Curtarolo (*Duke University*)

Materials are Technology Enablers

Important technologies are often materials-constrained.

There would be no:

- skyscrapers without steel girders
- information age without silicon
- commercial aviation industry without high-strength aluminum alloys
- alternative energy technologies without photovoltaics, batteries, thermoelectrics, magnets, etc.

Rapid Is Important

“Rapid commercial introduction of new materials and their incorporation into products would enhance the global competitiveness of the United States”

- Advanced Materials and Processing: The Fiscal Year 1993 Program, Federal Coordinating Council for Science, Engineering and Technology, Washington, DC, Office of Science and Technology Policy (1992).

“..rapid and efficient commercial embodiment of an idea in a product or service is an essential element of successful international competition”

- The Technological Dimensions of International Competitiveness, Committee on Technology Issues that Impact International Competitiveness, National Academy of Engineering, Washington, DC: National Academy Press (1988).



*To help businesses discover, develop, and deploy new materials **twice as fast**, we're launching what we call **the Materials Genome Initiative**. The invention of silicon circuits and lithium ion batteries made computers and iPods and iPads possible, but it took years to get those technologies from the drawing board to the market place. We can do it faster.*

-President Obama, Carnegie Mellon University, **June 2011**

A genome is a set of information encoded in the language of DNA that serves as a blueprint for an organism's growth and development. The word genome, when applied in non-biological contexts, connotes a fundamental building block toward a larger purpose.

A NIST Center for “Materials Data on Demand” (2007)

Goal: To provide materials data to enable the *acceleration* of advanced materials selection, and introduction into commerce

- “Just-in-time-data” - user center for industry and government (join? pay-as-you-go?)
- Generates experimental and modeling data
- Best-in-class data bases and informatics
- Proactive, responsive to industry and government roadmaps
- New metrologies and standards will emerge from new materials applications

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- The effort was too costly in equipment, computation and human resources
- Each class of materials (energy-related, catalytic, microelectronic, etc.) represented a huge effort
- Too big, and not appropriate for NIST - other agencies and industry were interested and needed to be involved (but no mechanism for doing so)

Workshop Goals

- Our goal is to address this question in a white paper: “What infrastructure is necessary to enable a sustained MGI approach to novel materials in the United States
- We have the right people and organizations in the room to identify major opportunities, and to implement them over the next years
- Be interactive - influence the future of the field by sharing your thoughts!