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Messler, Robert W. The essence of materials for engineers. Jones and Bartlett, c2011. TA 403 M47 2011

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Integrated design of multiscale, multifunctional materials and products. David L. McDowell... [et. al] Butterworth-Heinemann, 2010

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## Online Subscriptions:

American Society for Testing and Materials (ASTM) - is an international standards organization that develops and publishes voluntary consensus technical standards for a wide range of materials, products, systems, and services.

Nature Materials - Covers a range of topics within materials science, from materials engineering to structural materials.

OneMine.Org - A collective online digital library of mining and minerals technical papers, periodicals, books, and publications from professional societies around the globe.

Science Direct - The world's largest electronic collection of science, technology and medicine full text and bibliographic information. It contains over 25% of the world's science, technology and medicine full text and bibliographic information.

Springerlink - one of the world's leading interactive databases for high-quality STM journals, book series, books, reference works and the Online Archives Collection. SpringerLink is a powerful central access point for researchers and scientists.

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### Disclaimer:

*This pathfinder contains suggested materials on Materials Engineering that are available at the College of Engineering Library II. However, some references were not included.*

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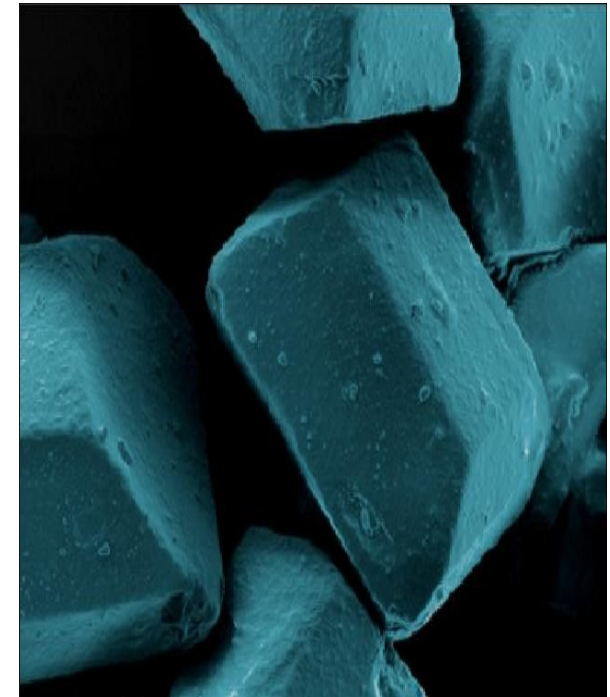


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## MATERIALS ENGINEERING

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## PATHFINDER



## Materials Engineering

- Materials science or materials engineering is an interdisciplinary field involving the properties of matter and its applications to various areas of science and engineering. This science investigates the relationship between the structure of materials at atomic or molecular scales and their macroscopic properties. It includes elements of applied physics and chemistry. With significant media attention focused on nanoscience and nanotechnology in recent years, materials science has been propelled to the forefront at many universities. It is also an important part of forensic engineering and failure analysis. The material science deals with fundamental properties and characteristics of material.

## HISTORY

- The material of choice of a given era is often its defining point; the Stone Age, the Bronze Age and Steel Age are examples of this. Materials science is one of the oldest forms of engineering and applied science, deriving from the manufacture of ceramics. Modern materials science evolved directly from metallurgy, which itself evolved from mining. A major breakthrough in the understanding of materials occurred in the late 19th century, when Willard Gibbs demonstrated that thermodynamic properties relating to atomic structure in various phases are related to the physical properties of a material. Important elements of modern materials science are a product of the space race : the understanding and engineering of the metallic alloys and silica and carbon materials, used in the construction of space vehicles enabling the exploration of space. Materials science has driven and been driven by, the development of revolutionary techniques such as plastics, semiconductors and biomaterials.

- Before the 1960s (and in some cases decades after), many material science departments were named metallurgy departments, from a 19th and early 20th century emphasis on metals. The field has since broadened to include every class of materials, including : ceramics, polymers, semiconductors, magnetic materials, medical implant materials and biological materials (materiomics).

### Classes of materials (by bond types)

- Material science encompasses various classes of materials, each of which may constitute a separate field. Materials are sometimes classified by the type of bonding present between the atoms:
  1. Ionic crystals
  2. Covalent crystals
  3. Metals
  4. Intermetallics
  5. Semiconductors
  6. Polymers
  7. Composite materials
  8. Vitreous materials

Source: [http://en.wikipedia.org/wiki/Materials\\_engineering](http://en.wikipedia.org/wiki/Materials_engineering)

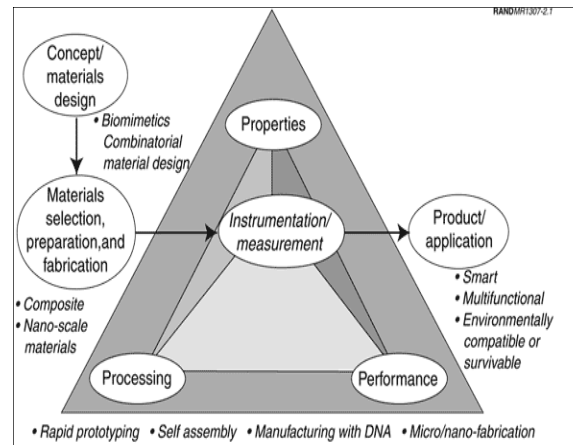


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