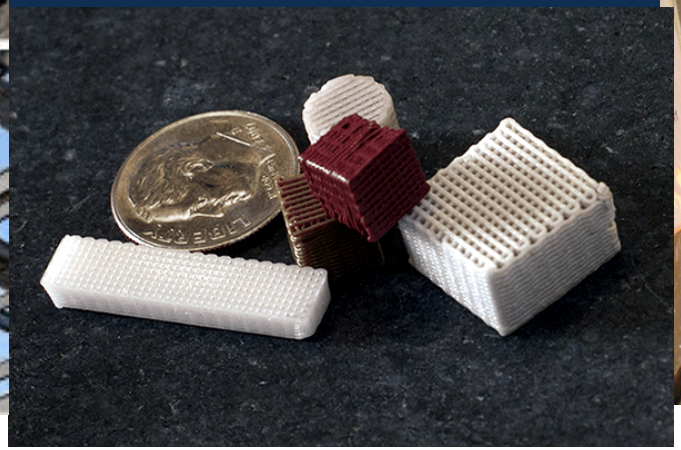

Materials Science and Engineering

Dr. Melissa Teague

July 19th, 201

SAND2018-8076PE

How I got here?

Sandia National Laboratories

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University of Missouri-Rolla

Sandia National Laboratories

KAPL Knolls Atomic Power Laboratory

Missouri S&T

INL Idaho National Laboratory

School of Mines 1874 Colorado

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So what the heck is a materials engineer?

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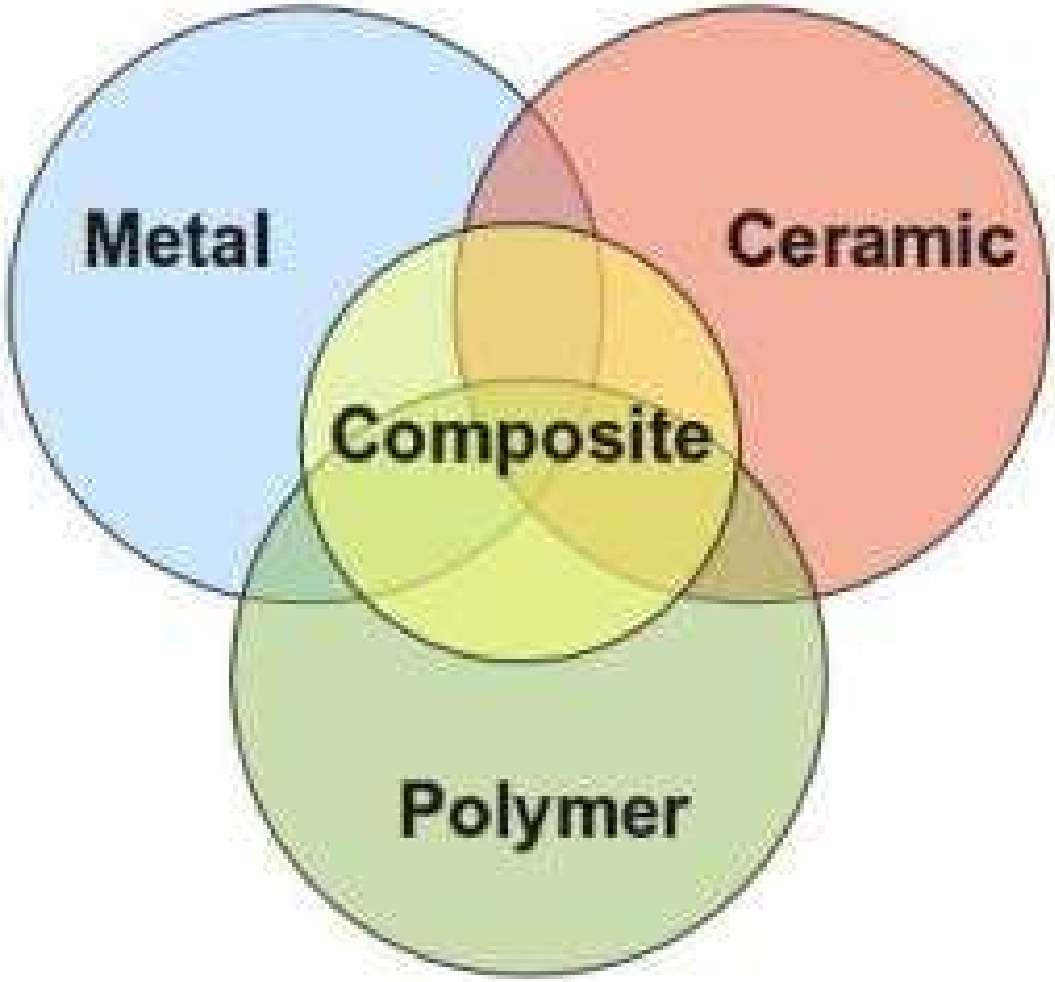
- A materials engineer process, test, and develop materials used to make a large variety of products such as aircraft wings, computer chips, biomedical devices, or even golf clubs. They study and evaluate the structures and properties of metal, composites, ceramics, plastics, and nano materials to create new materials that can meet particular chemical, electrical, and mechanical requirements.
- We solve problems!

Types of Materials

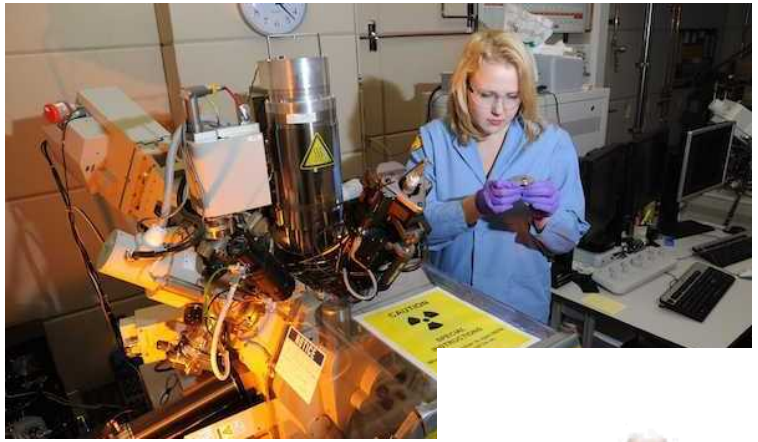


Metals

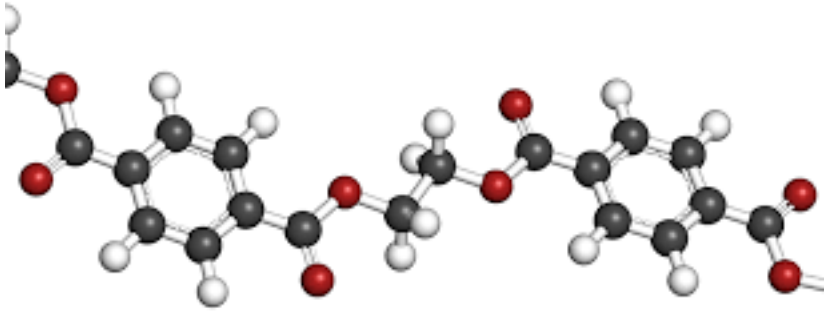
- a solid material that is typically hard, shiny, malleable, fusible, and ductile, with good electrical and thermal conductivity (e.g., iron, gold, silver, copper, and aluminum, and alloys such as brass and steel)
- Used for wide variety of things
- If you specialize in metals, you're a metallurgist

Ceramics

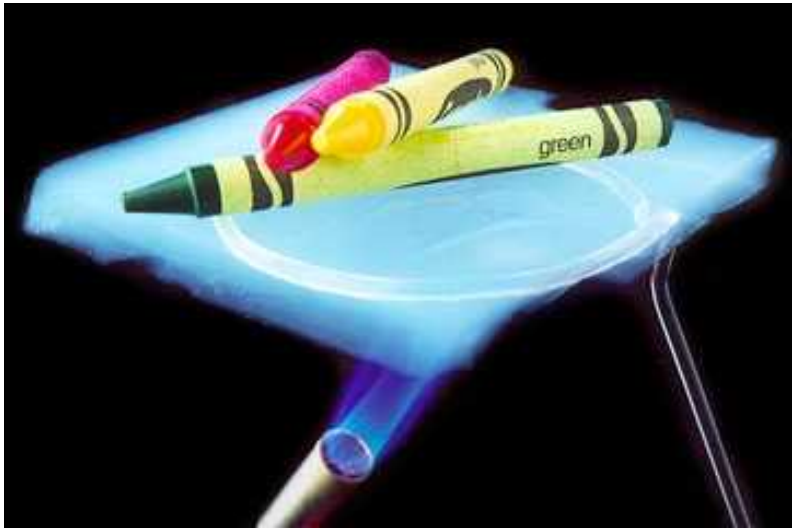
- A ceramic is a non-metallic solid material comprising an inorganic compound of metal, non-metal or metalloid atoms primarily held in ionic and covalent bonds.
- If you specialize in ceramics you're a ceramist (and the best kind of materials engineer)
- Pottery, glass, nuclear fuel, cell phone ringers, armor, space shuttle tiles etc. are all made from ceramics



Polymers

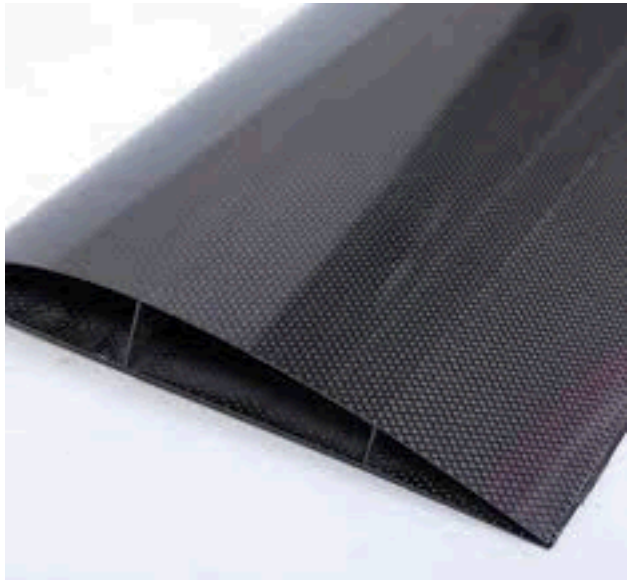


- a substance that has a molecular structure consisting chiefly or entirely of a large number of similar units bonded together, e.g., many synthetic organic materials used as plastics and resins.
- If you specialize in polymers, your are a polymer engineer/scientist
- Lots of applications such as epoxies, plastics, aerogels etc



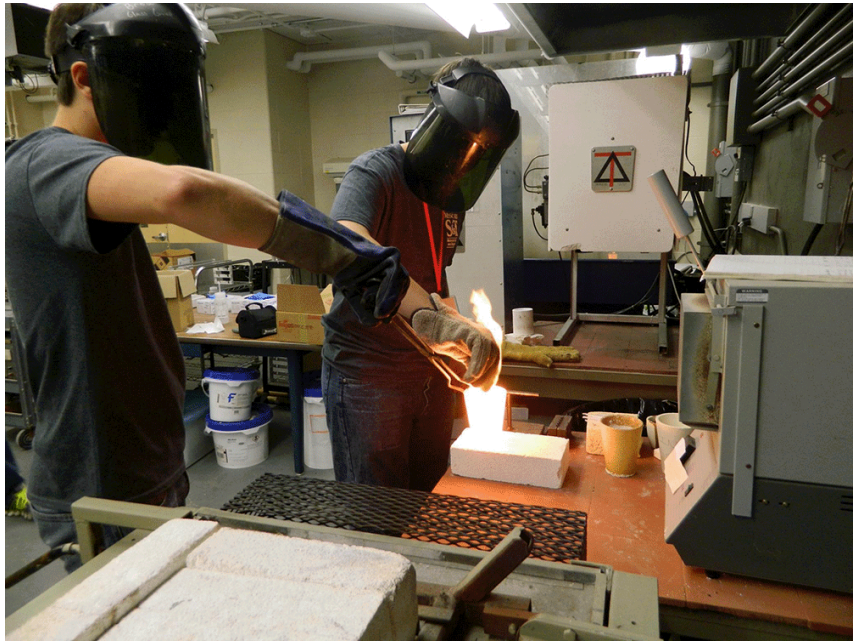
Composites

- A composite material (also called a composition material or shortened to composite, which is the common name) is a material made from two or more constituent materials with significantly different physical or chemical properties that, when combined, produce a material with characteristics different from the individual components.
- Used in variety of high tech applications
- Carbon fiber composites are some of the more common ones
- Typically have better performance than any one part of the composite



What it takes to be materials engineer

- Love to solve problems
- Enjoys getting to do wide variety of things (never bored)
- Typically requires bachelors degree or higher
- Enjoy making good living (avg. starting salary with BS is ~$60K)
- Want to have fun!



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Questions?