

New MSE Course: MTLE 4961/MTLE 6961

Materials Under eXtreme Conditions

INSTRUCTOR

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COURSE DESCRIPTION

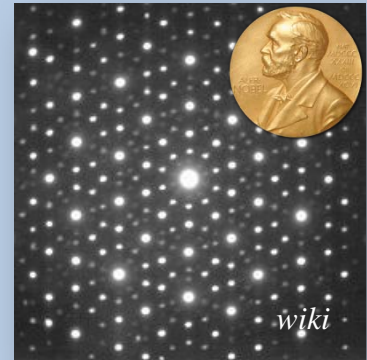
This course will review basic thermodynamic and kinetic concepts, which underpin how material behaves under extreme thermal, mechanical, chemical, electrical, magnetical conditions as well as high-energy irradiations. Engineering materials that can withstand hush environments and new materials with unique crystal structures/microstructures will be surveyed.

COURSE TOPICS

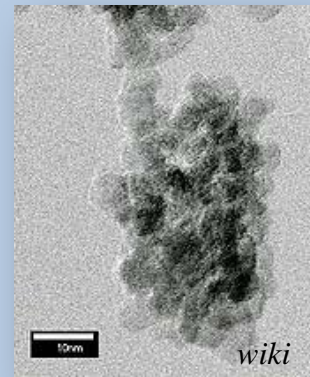
- Review of fundamental concepts of thermodynamic and kinetics
- Survey of experimental and computational techniques to investigate materials under extreme conditions
- Engineering materials applied in extreme environments: structural materials at high temperatures, radiation-resistance materials, materials for space
- Material behaviors under shock and other extreme thermomechanical, chemical, energetic flux, electromagnetic conditions

MISC

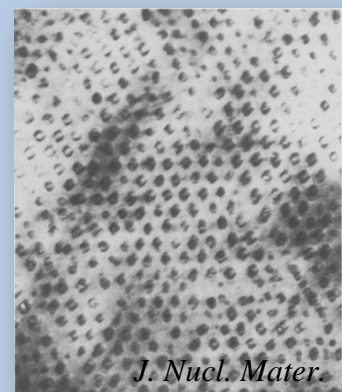
- Classes meet M/R 12:00-1:20
- Grade: Term-paper + Presentation + Attendance
- Grading is separate for undergraduate students and graduate students
- MTLE 4100 and MTLE 4150 or equivalent (for undergraduate students). There is no prerequisite for graduate students.



*Quasi-crystals from
eXtreme cooling*



*Nano-diamond from
Detonation*



*Ordered void-lattice
from Irradiation*