Instructor: Dr. Hongmei Luo  
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Office Hour: Tuesday/Thursday 3-4 pm or make appointments by email

Prerequisites: CHEM 111, 112, and Phys 211  
Laboratory Safety Training Classes  
(http://www.nmsu.edu/safety/training/class_schedule_index.htm)  
(1) Employee & Hazard Communication Safety (HazCom)  
(2) Hazardous Waste Management  
(3) Laboratory Standard


Course Objectives

The principal objectives of the course are to: i) introduce advanced processing methods for synthesizing nanomaterials, including nanoparticles, quantum dots, nanowires, nanotubes, mesoporous materials, thin films, ii) describe methods for characterizing the structure and properties of nanomaterials, iii) discuss current and emerging applications for nanomaterials.

Topic Covered (lectures):

- Physical Chemistry of Solid Surface  
- Carbon Nanotube and Graphene  
- Mesoporous Materials  
- Sol-Gel and Colloidal Chemistry  
- Self-Assembly  
- Lithography  
- Chemical Vapor Deposition  
- SEM, AFM, TEM  
- Batteries  
- Quantum Dot  
- Nanowires  
- Thin Films  
- Template Synthesis  
- Epitaxial Growth  
- Physical Vapor Deposition  
- XRD  
- Photovoltaic Solar Cells
Lab:  • Nanoparticle synthesis;  
    • Oxide thin films prepared by chemical solution method;  
    • Nanomaterials for lithium-ion battery application;  
    • XRD, SEM, TEM, AFM

Audience: This class is intended for undergraduate (Junior and Senior) and graduate students in Science and Engineering.

Paper and Presentation:


Your paper should include the following: (1) description and characterization of the nanomaterial, (2) description of the novel properties of that material, (3) application of the nanomaterial (including results), (4) implications of the findings, and (5) future experiments and why these experiments are important.

Graduate Students: Each student will prepare a research proposal on a topic related to nanomaterials and/or nanotechnology. The research proposal should: i) Summarize the state of knowledge of the topic, ii) Identify critical unresolved science and/or technology issues, and iii) Propose specific new research to resolve these critical issues.

References should be based on peer-reviewed journals, books, or patent citations.

Grading:  A (90-100%), B (80-89%), C (70-79%).
          Attendance: 5 %;  
          Homework (literature reading): 20 %
          Midterm: 25 %
          Lab report (team work): 20 %
          Final: Paper/Proposal (6-15 pages) and Presentation (20-30 min.): 30 %

Prepared in Jan. 2015

The NMSU Department of Chemical and Materials Engineering maintains a syllabus addendum containing course requirements common to all courses with the CHME prefix online. This document is accessible from the URL:  
http://chme.nmsu.edu/academics/syllabi/#CHME_Common_Syllabus_Addendum