

NEW COURSE!

CHE 694 Carbon Nanotubes: Properties, Processing, and Applications

Course Description: This interdisciplinary course will cover fundamentals of nanomaterials and nanoscale engineering using carbon nanotubes as a model system. It incorporates theory and applications while focusing on the following: synthesis, separations, unique chemical and physical properties, materials characterization, and current and potential applications of inorganic, biological, and hybrid materials. Prerequisite: graduate standing in engineering.

Instructor: Dr. Geyou Ao, Assistant Professor, Chemical and Biomedical Engineering

Course Outline:

1. Introduction: nanotechnology, types of nanomaterials, bio/nano hybrid molecules week 1
2. Carbon nanotube as a 1D model system: structure, synthesis, purification, and applications week 2
3. DNA approach for carbon nanotube structure selection week 3
4. Optical spectroscopy of carbon nanotubes week 4
5. Carbon nanotube applications in bioimaging and biosensing week 5
6. Other types of nanomaterials: boron nitride nanotubes/nanosheets, graphene, quantum dots, inorganic nanomaterials week 6
7. Colloids approach and particle interactions at the nanoscale week 7
8. Directed and self-assembly of nanomaterials week 8
9. Liquid crystals week 9
10. Rheology and optical microscopy in liquid crystals week 10-11
11. Polymer nanocomposites and applications week 12
12. Nanomaterial toxicology and safety week 13
13. Review: nanoscience perspectives and advanced technological development week 14

FALL SEMESTER Tuesday, Thursday 6-7:15 pm