CHEM 3012 NANOCHEMISTRY

Credit Points 10

Legacy Code 300895

Coordinator Robert Kaziro (https://directory.westernsydney.edu.au/search/name/Robert Kaziro/)

Description The subject covers basic theory of surface chemistry, latest technologies of surface depositions and industrial and commercial applications of nanomaterials and nanopowders. Upon successful completion, the students will achieve an in-depth understanding of techniques of preparation of nanomaterials and nanopowders that includes plasma arching, chemical vapour deposition, electrodeposition, sol-gel synthesis, ball milling and the use of natural particles. Technical aspects of process control on the microstructure and properties of coatings will be discussed. Case studies of applications of nanopowders and nanomaterials such as biomedical implants, insulators, high power magnets, molecular sieves, supercomputers, jet engines and other industrial applications will be pursued.

School Science

Discipline Chemical Sciences, Not Elsewhere Classified.

Student Contribution Band HECS Band 2 10cp

Check your HECS Band contribution amount via the Fees (https://www.westernsydney.edu.au/currentstudents/current_students/fees/) page.

Level Undergraduate Level 3 subject

Pre-requisite(s) CHEM 1003

Equivalent Subjects LGYA 6162 - Nanochemistry LGYA 6030 - Nanopowders and Nanomaterials

Assumed Knowledge

An understanding of the content of the subjects Nanotechnology 1 and Nanotechnology 2 or equivalent.

Learning Outcomes

On successful completion of this subject, students should be able to:

1. Explain the theory of surface chemistry, latest technologies of surface depositions and industrial and commercial applications of nanomaterials and nanopowders.
2. Explain the techniques of preparation of nanomaterials and nanopowders that includes plasma arching, chemical vapour deposition, electrodeposition, sol-gel synthesis, ball milling and the use of natural particles.
3. Conduct case studies of applications of nanopowders and nanomaterials such as biomedical implants, insulators, high power magnets, molecular sieves, supercomputers, jet engines and other industrial applications.
4. Synthesize nanoparticles by electrodeposition of gold and/or zinc oxide nanoparticles and analyse products by atomic force microscope.

Subject Content

1. Basics of nanomaterials and nanopowders and their attributes and characteristics
2. Theory of surface and bulk and characteristics of nanomaterials and nanopowders
3. Different techniques of preparation, their advantages and disadvantages
4. Biomimetic processes for nanomaterials and nanopowders
5. Feasibility of development of synthetic nanomaterials and nanopowders and their uses

Prescribed Texts

- Wilson, M 2002, Nanotechnology: basic science and emerging technologies, UNSW Press, Sydney.

Teaching Periods