ARC Centres of Excellence Program

ARC Centre for Nanostructured Electromaterials

Interim Director: Professor G G Wallace

Collaborating Institutions: The University of Wollongong
Monash University
CSIRO – Molecular Science
CSIRO – Manufacturing Science & Technology
CSIRO – Textile & Fibre Technology
University of Akron
Massey University
Bionic Ear Institute

This Centre was relinquished with effect 1 July 2005 pursuant to the commencement of the new Centre of Excellence for Electromaterials Science. (See outcomes of 2005 Centre of Excellence selection round.)

Much scientific understanding of the behaviour of materials breaks down when the material takes on nanodimensions (dimensions involving fewer than approximately 1,000 atoms). Materials that are electrical or thermal insulators in bulk become conductors when formed on nanoscales, inert materials become chemically active, and opaque materials become transparent or photoemissive. A particularly promising area of research concerns the movement of electrical charges (electrons or ions) through materials structured on nanoscales, such as nanowires, conducting polymers, and carbon nanotubes.

The Centre aims to study nano-level phenomena in electromaterials. Building on a strong base of fundamental theory, the research program will create new nanostructured electrode materials, investigate ion transport in nanomaterials and ionic liquids, and investigate photo-electrochemical processes in a variety of nanostructures. This fundamental research on electrofunctional materials will be applied to invent and improve energy conversion systems (e.g. photovoltaics and electroactuators), energy storage systems (e.g. batteries and hydrogen storage devices), and systems to transfer energy to and from biosystems (e.g. wound healing and electronic nerve stimulators).