

ADVANCED SYNTHETIC MATERIALS GROUP



FACULTY OF SCIENCE AND INFORMATION TECHNOLOGY



OVERVIEW

The Advanced Synthetic Materials Group (ASMG) is the major research grouping involving chemists at the University of Newcastle.

The group brings together researchers who are interested in the design, synthesis and characterization of materials that will further our knowledge in, as well as provide applications of, novel inorganic and organic materials. Interests cover a good blend of development and applied chemical science.

The diverse range of skills of the group members is a key to the capacity of the ASMG to evolve and solve new problems of a pure and applied nature.

Several of our members are also involved with the Priority Research Centres (PRCs) of Organic Electronics, Chemical Biology, and the cross-faculty PRCs of Advanced Particle Processing and Transport, and Energy, as well as the Newcastle Institute for Energy and Resources.

OBJECTIVES

The ASMG deals with research into areas such as bio-inorganic and coordination chemistry, medicinal chemistry, the extraction of metals, colloid and surface chemistry, heterogeneous and homogeneous oxidation catalysis, organic and natural product chemistry, and molecularly imprinted polymers.

The group is heavily instrument-based, a consequence of the nature of the research interests of the group. It employs a wide range of techniques such as nuclear magnetic resonance (NMR) spectroscopy, virtually all forms of optical spectroscopy (e.g. infrared, UV-visible, fluorescence, circular dichroism), chemical analysis (e.g. inductively coupled plasma – atomic emission spectroscopy and atomic absorption spectroscopy), automated pH and spectroscopic titration facilities, mass spectrometry and GC-mass spectrometry, atomic force microscopy, surface area characterization, thermogravimetric analysis/differential thermal analysis (TGA/DTA), differential scanning calorimetry (DSC), and scanning electron microscopy (SEM).

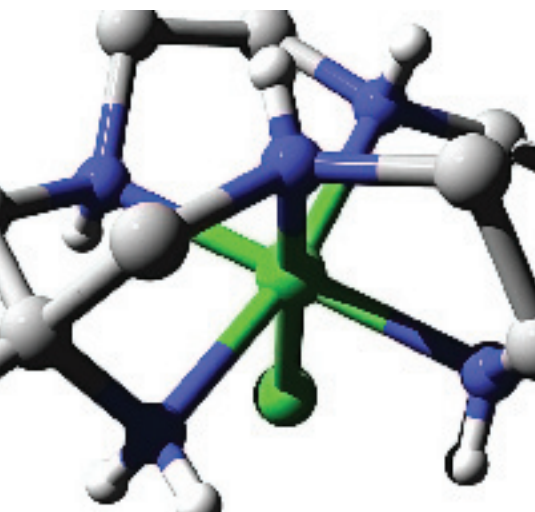
EXTERNAL COLLABORATORS

- CSIRO Centre for Energy Technology
- Children's Medical Research Institute
- Volker Hauke, Berlin

RESEARCH SUPPORT

Research support regularly comes from multiple sources, including:

- ARC Discovery Grants
- NHMRC Grants
- CSIRO Flagship Grants
- Ramaciotti Foundation
- Epilepsy Research Foundation USA
- Australian Institute of Nuclear Science and Engineering (AINSE)
- Australian Cancer Research Fund
- Found Animals Foundation



EXAMPLES OF CURRENT PROJECTS

- Helical supramolecular metal complexes
- Chemical syntheses of targeted drug libraries
- Chemical studies of amine solvents for the capture of CO₂
- Surfactant and polymer organisation at the solid/solution interface
- Linear copolymer-based molecularly imprinted films
- Heterogeneous and homogeneous oxidations
- Drug lead compounds from marine organisms
- Nanostructure of ionic liquids in the bulk and at surfaces

RESEARCH OUTCOMES

The medicinal chemistry group has recently been the recipient of a prestigious epilepsy research foundation grant. This will assist in the development of a new series of anti-epileptic drugs and recognizes the Newcastle group as being world leaders in this field. A recent commercial venture has involved the sale of dynamin inhibitors to Ascent Scientific, UK.

GROUP MEMBERS

Dr Robert Burns
Dr Clovia Holdsworth
Prof Geoffrey Lawrance
A/Prof Marcel Maeder
Prof Adam McCluskey
Dr Ian van Altna
A/Prof Erica Wanless
Dr Michael Bowyer (Ourimbah Campus)
Dr Rob Atkin

RESEARCH TOPICS

ASMG members are currently active in research in the following areas:

- Advanced inorganic and bio-inorganic materials
- Chemical Biology
- Colloids and surface science
- Polymer colloids
- Chemometrics
- CO₂ capture and regeneration technology
- Molecularly imprinted polymers and biosensors
- Heterogeneous oxidation catalysis using gold nanoparticles
- Marine natural products
- Ionic liquids

CONTACT

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