

**Research Fellowship positions available for ARC Grant DP0877382
Novel, network polymers with photoinduced plasticity**

Chief Researchers:

Prof WD Cook, Monash University

Dr J Sun, Monash University

Prof CN Bowman, University of Colorado

Dr TF Scott, University of Colorado

Dr SH Thang, CSIRO - Molecular and Health Technologies

Project summary: The production of crosslinked polymers (including thermosets and rubbers) is a multi-billion dollar industry and these polymers are irreplaceable in their use in numerous applications in the household goods, medical, electronics, automotive and construction industries. However, they shrink during solidification causing internal stresses which weaken them and they can not be reshaped, repaired or recycled. This project is aimed at developing a novel range of crosslinkable polymers having network strands (initially containing allylic sulphide moieties) which rearrange and thus change shape or reduce stress on irradiation by light. These materials could be used in applications ranging from repairable composites, stress-free lens, non-shrinking dental filling materials and light-sensitive actuators.

Positions available:

Position 1: Research Fellow - Academic Level A Step 3 (\$61,820)

An ARC Discovery grant-funded Research Fellowship is available for up to 4 years to work on a project entitled: Novel, network polymers with photoinduced plasticity

In this part of the project we will be synthesizing crosslinkable monomers containing functional groups which are sensitive to attack and β -scission by photochemically or thermally generated radicals. Initial work will be on incorporation of allylic sulphide moieties into the backbone of a range of multifunctional monomers but this will be extended to a wider range of photosensitive groups, including pseudo-living systems. The Research Fellow will also undertake research to confirm the photoplasticity mechanism and the longevity of the chain radicals. The candidate will also assist and supervise students on a variety of research projects involving the synthesis and characterization of novel organic and polymeric materials. This project is in association with CSIRO - Molecular and Health Technologies and the University of Colorado and it is anticipated that the successful applicant will spend some time working in those laboratories.

This position requires a Ph.D. in Polymer or Organic Chemistry with extensive experience in polymer synthesis and polymer characterization. Knowledge of standard analytical techniques including NMR, ESR, FT-IR, UV-Vis, GPC, and DSC is preferred. Excellent oral and written communication skills in English are required, and the presentation and publication of scientific results in peer-reviewed journals is expected. Applications with a letter of interest, curriculum vitae, a brief description of research interests, and contact details for three academic references should be sent to:

Prof W. D. Cook

Department of Materials Engineering

Monash University 3800, Victoria Australia

Email: wayne.cook@eng.monash.edu.au

Phone (+61) (03) 99054926 (office)/4941 (General office)

Fax (+61) (03) 99054940

Position 2: Research Fellow - Academic Level A Step 3 (\$61,820)

An ARC Discovery grant-funded Research Fellowship is available for up to 4 years to work on a project entitled: Novel, network polymers with photoinduced plasticity

In this part of the project we will study the polymerization kinetics of network forming monomers containing the thermally or photochemically labile groups and will investigate the photo-plasticity mechanism. We will investigate the visible and thermal activation of the plasticity process in a range of crosslinked polymers and investigate photo/thermal-plasticity in flexible and rigid polymers as a function of temperature. The application of these systems to adhesive bonding, composite prepreg formation, crack healing and actuation will also be investigated. The candidate will also assist and supervise students on a variety of research projects involving structure-property relationships in polymeric materials. This project is in association with CSIRO - Molecular and Health Technologies and the University of Colorado and it is anticipated that the successful applicant will spend some time working in those laboratories.

This position requires a Ph.D. in an appropriate area of Materials or Polymer Science/Engineering with extensive experience in structure-property relationships. Knowledge of analytical techniques including rheology, DMTA, tensile testing and creep/stress relaxation, DSC, FT-IR, UV-Vis, ESR and NMR is preferred. Excellent oral and written communication skills in English are required, and the presentation and publication of scientific results in peer-reviewed journals is expected. Applications with a letter of interest, curriculum vitae, a brief description of research interests, and contact details for three academic references should be sent to:

Applicants with a PhD should apply in writing, including CV to:

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