

Star Polymers; Versatile Macromolecular Architectures with a Bright Future

Dr Anton Blencowe

Polymer Science Group, The Department of Chemical and Biomolecular Engineering, The University of Melbourne, Parkville, Melbourne, Victoria 3010, Australia.

Star polymers are comprised of multiple arms or branches radiating from a central point or core and have been of huge scientific interest since they were first prepared sixty years ago, as a result of their unique physical properties. Star polymers are not just an academic curiosity, but are currently employed or under investigation in a wide range of industries and commercial materials ranging from engine oils and coating technologies to contact lenses and biomedical devices. Although there are many different types of star polymers and methods for their synthesis, recent advances in the field of controlled radical polymerisation has enabled the facile production of complex star polymer architectures from a large range of monomer families, without the requirement of highly stringent reaction conditions. In particular, well-defined, nanometre scale core cross-linked star (CCS) polymers, which are readily accessible by controlled radical polymerisation techniques, have been increasingly prominent in the scientific literature. Given the significant body of work that has been conducted into CCS polymers it is evident that this is a very active area of polymer research, encompassing not just synthetic chemistry, but also the disciplines of physical chemistry, materials science and polymer therapeutics. It is only recently that the application of such intricate and functionally diverse CCS polymer architectures have started to be realised and it is foreseeable that in the not to distant future CCS polymers will play a major role in many advanced materials and technologies. Our research group is focused around CCS polymer design, functionalisation, characterisation and application, with the aim of developing advanced materials for real-world applications; an overview of which will be provided in the title presentation.