

Chemical Engineering Seminars – MT 2007

Week 5: Tuesday 6 November, 4:15-5.15 pm
Lecture Room 2, Thom Building, Engineering Science

Functional Polymers by Covalent Surface Modification

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Abstract

We have developed a chemical treatment which permits the direct modification of the surface properties of a polymer, but without changing its bulk properties. It is versatile and simple to execute, leading to attachment of functionality by covalent bond formation, and capable of immediate adaptation to existing production processes. We have demonstrated its efficacy for the manipulation of the surface chromophoric, biocidal, biocompatibility, hydrophobicity/phillicity, oleophobicity/phillicity and adhesive characteristics of polymers, for a very broad range of substrate types, in particular low surface energy organic polymers such as polypropylene, polyimide and polyester, as well as materials such as silica, glass and diamond. This method offers the opportunity for tailoring the surface properties of diverse polymers for a wide variety of applications, including electronics, sanitisation, healthcare and security.

Bio-sketch

Dr Mark Moloney, currently a Reader in Chemistry at the Department of Chemistry at the University of Oxford, completed his undergraduate and graduate studies at the University of Sydney, obtaining a Bachelor of Science (Honours) First Class and University Medal (1981) and PhD for the thesis entitled "The Chemistry of Vinyllead Triacetates" (1985), and was awarded the Royal Australian Chemical Institute Student Prize for 1981. After postdoctoral research with Professor J. E. Baldwin FRS (Oxford) during 1985-7, working on aspects of penicillin biosynthesis, he was awarded the inaugural Glaxo Research Lectureship in Organic Chemistry at St Catherine's College, Oxford (1987-1990), and was subsequently appointed to a University Lectureship at the University of Oxford, jointly held with the E. P. Abraham Tutorial Fellowship at St Peter's College and Lectureship at Trinity College, Oxford. In 1991, he was awarded the Rennie Memorial Medal (Royal Australian Chemical Institute). He has been a Fellow of the Royal Australian Chemical Institute and Royal Society of Chemistry since the mid-1990s, and am a Member of the Editorial Advisory Board for "Current Organic Synthesis," "The Open Organic Chemistry Journal" and "Current Drug Discovery Technologies". He is a member of the Chemistry Panel for the Engineering and Physical Sciences Research Council (2005-2008) and is an expert assessor for the Australian Research Council, the Georgian Research Fund, and the Agency for Science, Technology and Research (Singapore). He is Academic Founder and non-Executive Director for Oxford Advanced Surfaces, a spin-out company formed in September 2006. His research has concentrated in three main areas: nitrogen heterocycle synthesis and synthetic methodology, of relevance to the synthesis of pharmaceutical target molecules, and materials modification chemistry.