

The Manchester Conference Centre, Manchester, UK, 14–16 July 2004

Although natural polymers fibres such as hair, wool and silk have been exploited since antiquity, the development of synthetic polymers in the 20th century was driven by the need for man-made fibres. Because of this, polymer fibres have been the focus of intensive research for a many years and, by some people, the field is now perceived as being mature. This, however, is far from the case and in recent years there have been unparalleled developments in the preparation of new polymer-based fibres, new techniques of fibre characterisation and novel applications of polymer fibres. Moreover, polymer fibres are finding increasing use in high-performance composites where their high levels of stiffness and strength combined with low density give rise to materials with outstanding mechanical properties.

This special section of the *Journal of Materials Science* contains twelve papers selected specially from a number presented at the Third International Conference 'Polymer Fibres 2004' held in Manchester in July 2004. At the conference there was a total of 38 oral presentations and 35 poster papers with delegates coming from 20 different countries.

The main themes of the meeting were:

- Techniques
- Natural Fibres
- High Performance Fibres
- Composites
- Fibre Assemblies
- Nanostructured Fibres

To set the scene in each area, a number of keynote presentations were made covering a number of different aspects of the subject:

- X-ray Diffraction from Single Polymer fibres — C. Riekkel
- Silk: Secret of the Spider's Success — R.J. Young
- Fibers as Medical Devices — M. Jaffe
- M5: from Laboratory Curiosity to Semi-technical Demonstration — D. Sikkema
- Novel Composites by Hot Compaction — I.M. Ward
- Structural Mechanics of Fibre Assemblies — J.W.S. Hearle
- Carbon Nanotube Based Continuous Fibre — A.K. Windle

The twelve papers in this issue are a representative selection of the research presentations under all of these themes. The first paper by Cho and Jeong is concerned with the estimation of fibre strength from the mechanical testing of the properties of fibre bundles. This is followed by a paper by Smole and co-workers who have undertaken a detailed study of the characterisation of natural fibres obtained from different types of grass. The next two papers are concerned with the spinning of silk fibres using different approaches. The development of conductive polyester and polyamide fibres is described in the paper by Harlin and co-workers. The next three papers deal with the effect of surface modification upon the properties of fibres. Warren and co-workers describe how gas plasma can be used to modify the surface of polypropylene tape and Prasithphol and Young show how Raman spectroscopy can be used to determine the strength of the fibre-matrix interface in model Technora/epoxy composites. The generation of functional nanostructures upon the surface of polypropylene fibres using plasmas is then described in the paper by Wei and co-workers. The next two papers are concerned with applications of non-wovens, firstly by Tyeo and co-workers for filtration and secondly by Kosuge and co-workers for sound absorption. The final two papers by Jeong and co-workers describe the development of polymer fibres with antibacterial properties for applications such as in the biomedical industry. Although it has not been possible to include all of the papers presented at the meeting it is hoped that a flavour of the exciting research developments in the field Polymer Fibres will be conveyed.

POLYMER FIBRES 2004

In view of the success of the Conference it is intended to hold a fourth one in Manchester in July 2006 and again publish a selected number of papers in a special section of the *Journal of Materials Science*. Further details may be obtained from me at the address below.

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