Functional Condensation Polymers

Edited by

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and

Graham G. Swift

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Preface

Most synthetic and natural polymers can be divided according to whether they are condensation or vinyl polymers. While much publicity has focused on funtionalized vinyl polymers, little has been done to bring together material dealing with functionalized condensation polymers. Yet, functionalized condensation polymers form an ever increasingly important, but diverse, group of materials that are important in our search for new materials for the 21st century. They form a major part of the important basis for the new and explosive nanotechnology, drug delivery systems, specific multi-site catalysts, communication technology, etc.

For synthetic polymers, on a bulk basis, vinyl polymers are present in about a two to three times basis. By comparison, in nature, the vast majority of polymers are of the condensation variety.

Functionalized or functional condensation polymers are condensation polymers that contain functional groups that are either present prior to polymer formation, introduced during polymerization, or introduced subsequent to the formation of the polymer. The polymers can be linear, branched, hyper-branched, dendritic, etc. They are important reagents in the formation of ordered polymer assemblies and new architectural dendritic-like materials.

Condensation polymers offer advantages not offered by vinyl polymers including offering different kinds of binding sites; the potential for easy biodegradability; offering different reactivities undergoing reaction with different reagents under different reaction conditions; offering better tailoring of end-products; offering different tendencies (such as fiber formation); and offering different physical and chemical properties.

This book is based, in part, on an international symposium given in April 2001 as part of the national American Chemical Society meeting in San Diego, California, which was sponsored by the Division of Polymeric Materials: Science and Engineering. About forty presentations were made at the meeting.

Sample areas emphasized included dendrimers, control release of drugs, nanostructural materials, controlled biomedical recognition, and controllable electrolyte and electrical properties.

Of these presentations, about half were chosen to be included in this volume. Areas chosen for this book are those where functional condensation polymers play an especially critical role. These are nanomaterials, light and energy, bioactivity and biomaterials, and enhanced physical properties.

The book is not comprehensive, but illustrative, with the authors selected to reflect the broadness and wealth of materials that are functional condensation polymers in the areas chosen for emphasis in this book. The authors were encouraged to place their particular contribution in perspective and to make predictions of where their particular area is going.

Functional Condensation Polymers

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