

Gels and Biomedical Materials

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Gels and Biomedical Materials

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PREFACE

This issue contains the proceedings of Symposia LL and MM of the 2011 MRS Fall Meeting, which was held November 28 – December 2 at the Hynes Convention Center in Boston, Massachusetts.

“Synthetic and Biological Gels” (Symposium LL) focused on advances made in the field and demonstrated the growing importance of these materials in a wide variety of applications. Insights were reported concerning the structural and dynamic properties of molecular and polymeric gels as well as dispersions in which the liquid component was aqueous or organic. Many of the presentations focused on potential or realized applications of gels for tissue engineering or medical interventions at the cellular or subcellular levels. Gels and cells linked together a wide range of subject matter ranging from the biomechanical properties of cartilage to fundamental studies of how cells interact with the polymeric scaffold upon which they are cultured. A number of papers dealt with the design, synthesis, and characterization of the structure and physical properties of protein-based hydrogels. The understanding of these complex systems benefited from the combination of thermodynamic considerations and molecular simulation.

“Micro- and Nanoscale Processing of Biomedical Materials” (Symposium MM) highlighted several recent advances in the processing of microstructured and nanostructured materials for use in medical diagnosis and treatment. For example, building blocks for bottom-up assembly of biomaterials are being developed, which will simplify the development of nanostructured materials. In addition, functional nanobiomaterials are being developed that exhibit unique interactions with proteins, DNA, and other components of biological systems. The symposium covered novel techniques for processing metals, ceramics, polymers, natural materials, and composite materials that enable enhanced diagnosis and treatment of medical conditions. In addition, the symposium allowed for discussion among the many groups involved in the development and use of biomaterials, including materials researchers and medical device manufacturers.

We would like to thank the staff at the Materials Research Society for making this proceedings volume possible. We hope that this volume becomes a valuable resource on microstructured and nanostructured biomaterials, which not only contributes to advances

in biomaterials research but also signifies the growing role of the Materials Research Society in this rapidly growing area.

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