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**MATERIALS RESEARCH SOCIETY  
SYMPOSIUM PROCEEDINGS VOLUME 1190**

# Active Polymers

Symposium held April 14–17, 2009, San Francisco, California, U.S.A.

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## PREFACE

The field of polymer research is progressing rapidly from passive materials providing a certain set of properties to active polymers, which provide, receive, and respond to signals from their environment. This includes interactions with molecules, biological systems, and physical stimuli. Research in active polymers has been driven by the increasing demand for intelligent materials, especially in biomedical and aerospace applications. Tremendous progress in synthesis, analytics, and molecular modeling enables scientists today to develop active polymer systems in a knowledge-based approach.

Biological systems might serve as blue prints for biomimetic and bionic solutions. Interdisciplinary approaches combining the expertise of chemists, physicists, biologists, pharmacologists, and materials engineers lead to innovative material concepts, e.g., enabling morphing structures or “living” textiles. Emerging active polymers respond to a range of stimuli from changes in pH and temperature to light and magnetic fields. Interactive behavior can also be stimulated by small bioactive molecules or influences of complex biological systems. Remote and on-demand control is envisioned, and model systems have been developed.

Symposium NN, “Active Polymers,” held April 14–17 at the 2009 MRS Spring Meeting in San Francisco, California, was the first MRS symposium focused on active polymers. A highly interdisciplinary scientific community used this great opportunity to gather and discuss the topics: shape-memory polymers; shape-changing polymers; responsive hydrogels; stimuli-sensitive systems; intelligent polymers in biological systems; polymer-based actuators, sensors, and switches; active surfaces; and biomedical applications of active materials, especially for tissue regeneration and controlled drug release. Symposium NN “Active Polymers” far exceeded our expectations in participation, diversity of topics, and duration, with 60 oral presentations and 43 posters spanning twelve sessions.

Notable presentations included shape-memory nanocomposites by Richard A. Vaia, and color-changing shape-memory polymers by Patrick T. Mather. Duncan Maitland reported on design and realization of biomedical devices based on shape-memory polymers. The application of shape-memory polymers as space deployables and novel actuators was presented by Steven C. Arzberger. Rein V. Ulijn presented about exploiting enzymes in responsive materials and nanofabrications.

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