Smart Materials Fabrication and Materials for Micro-Electro-Mechanical Systems
Smart Materials Fabrication and Materials for Micro-Electro-Mechanical Systems

Symposium held April 28-30, 1992, San Francisco, California, U.S.A.

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Preface

This symposium marked the first of its kind to be given by the Materials Research Society on the rapidly developing fields of "smart materials" and micro-electro-mechanical systems. Originally we had planned to have symposia for each topic, however the materials issues tend to be very similar and thus both were combined. The organizers felt that this created some synergy and hopefully will inspire future uses of adaptive and active materials in these fields.

The science and technology of the 21st century will rely heavily on the development of new materials. Such materials should be innovative with regards to structure, functionality and design. They will have characteristics similar to what has been projected for the current generation of smart structures; i.e. embedded sensors, actuators and control mechanisms that are fully integrated into the structure giving it the ability to sense stimuli imposed upon it and to take an appropriate response to those stimuli in a predetermined and controllable fashion. However, unlike smart structures, smart materials will be fabricated in such a manner that the sensors, actuators and control mechanisms will be part of the microstructure of the material itself. This will typically involve the design, synthesis and processing of such materials at the atomic and/or molecular level.

As the rapidly growing field of micro-electromechanical systems (MEMS) develops, issues of material selection and material characterization will become increasingly important. Indeed, the number of materials which are available for use in the fabrication of MEMS is expanding dramatically. The papers in this volume consider the processing, characterization and application of a wide range of materials, including polycrystalline silicon (the "traditional" material for MEMS), ferroelectrics, optically active materials, metals, polymers, and more. These papers make it clear that "electrical" and "mechanical" communities within MEMS come together through the materials.

Peter Jardine
Andrew Crowson
George Johnson
Mark Allen

June 1992
Acknowledgments

Dr. Jardine would like to thank Dr. Edward Chen of the U.S. Army Research Office for supporting the "Smart Materials Fabrication" section of the symposium and to the invited speakers for their valuable contributions to the symposium. The U.S. Army Research Office has been singularly active in promoting both fundamental and applied research in the area of smart materials, thus their support for this symposium was much appreciated.

The editors would also like to thank the following companies for their support for the "Materials for Micro-electro-Mechanical Systems" section of this symposium.

Ford Motor Company
Hewlett-Packard Company
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MATERIALS RESEARCH SOCIETY SYMPOSIUM PROCEEDINGS


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