

electro-migration on device reliability. There are also methods detailed for non-destructive testing using $1/f$ noise and non-linearity parameters. The authors present a good blend of applications and theory by including many graphs for specific materials along with generalized theory.

Readers interested in this book would include those who produce or research thin-metal films, especially for semiconductor applications or those wanting to get a quick and concise understanding of the critical factors needed to produce high quality thin-metal films.

Handbook of Building Materials for Fire Protection

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Fire protection safety is a vitally important area of research especially with many new materials being introduced into building structures and electrical equipment. The flammability characteristics of such materials are an important area of safety concern. This handbook explores the flammability properties and behavior of materials in fires. With increasing awareness and requirements on material flammability, not only do designers of building materials but also designers of electrical and electronic devices need to be aware of the flame properties of materials. Polymers and other materials used in wiring, electrical devices, and electrical components can be potentially flammable, smoke hazards, and combustible. This book covers the flammability properties of building materials as well as polymers used in the electrical industry and helps a designer specify and choose the best material and additive system for reducing material hazards in a fire.

It begins by explaining the fundamentals of material fire hazards including flammability and smoke dangers. Since many of our readers may not be familiar with flammability of materials, this background

is very informative and gives the reader essential technical knowledge of how fires can start from various materials, what gases can be present, fire energy, ignition points for gases, liquids, and dusts and much more. The book continues with essential information on testing and standards. Along with the excellent background chapter, our readers would be most interested in the chapters on the flammability of various polymers and choices of flame-retardants to minimize their fire hazard potential. There are also chapters detailing fire protective clothing, building construction materials, liquid and chemicals, and military systems.

The book is filled with lots of data for a wide variety of polymers and common building materials and would be of interest to those who must meet flammability requirements in materials used in buildings or homes including cable, wire, power distribution engineers.

Materials and Devices for Smart Systems, vol. 785

Y. Furuya, E. Quandt, Q. Zhang, K. Inoue, and M. Shahinpoor, Editors

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This volume contains 70 papers from the 2003 MRS Fall Meeting in Boston. The general areas of smart materials covered are electrostrictive and piezoelectric materials, shape memory alloys (SMA), magnetostrictive alloys, magnetic SMA's, electro-active polymers, multifunctional sensor/actuator films, and MEMS devices.

Among the many interesting materials and devices papers in this volume, some of the more relevant papers for our readers on dielectrics cover the following. One paper is on an analysis and model of electro-mechanical coupling in an electroactive polymer-based actuator. While an interesting topic, the paper only covers a theoretical analysis and does not detail materials or devices. A number of

papers present structural and dielectric properties of various thin film materials. These papers describe high dielectric constant materials that maintain a high dielectric constant at high temperatures over a wide frequency range. These may have many interesting applications for high temperature capacitors and other devices. Another paper related to dielectrics and polymers describe "Piezoelectric transformers for space applications." This paper only introduces potential applications and points out issues rather than actually describing any designs or new materials, but it is intriguing for anyone working on miniaturizing transformers for space flight. The paper on "Hybrid actuation in coupled ionic/conducting polymer devices" shows several useful strain versus frequency and time graphs for a metal plated Nafion (DuPont) actuator.

If your interests are in new actuator materials in general then there are many other papers that would also be of interest, especially on magnetic based materials.

Electronics on Unconventional Substrates – Electrotiles and Giant-Area Flexible Circuits, vol. 736

M. S. Shur, P.M. Wilson, and D. Urban, Editors

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Clothes that change color, sensitive robotic skin, tactile gloves, chemical sensing clothing, and giant flexible displays are just some of the new technologies being investigated by researchers attempting to combine conventional microelectronics to rather unconventional substrates. Many of these substrates include clothing, polymers, fibers, and thin-metal films. Applications being investigated include military as well as industrial/commercial. The papers, included in this volume, are invited