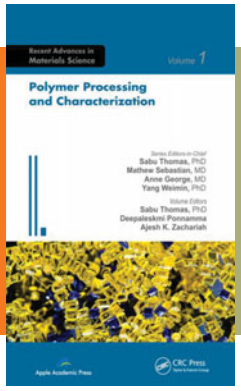

Polymer processing and characterization
Advances in materials science, Volume 1
Editors: Sabu Thomas, Deepalakshmi Ponnamma, and Ajesh K. Zachariah

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In *The Graduate*, a movie made 45 years ago, Dustin Hoffman's character received a famous one-word-piece-of-advice about the future after his graduation: plastics. Since then, polymers—of which plastics is a subset indicating synthetic products—have become the largest class of engineering materials in use, replacing metals and ceramics in a number of applications and creating new fields of applications. The subject is well served by existing outstanding textbooks and authoritative handbooks. However, because of continued rapid progress in the field, contributions with new outlooks and the latest developments are still welcome.

Polymer processing and characterization, the first volume in a series on advances in materials science, is devoted to select 10 topics in polymer science. Two of the articles address nanocomposite polymer electrolytes. The first shows that by dispersing nanosized calcium phosphate, the ionic conductivity of PVDF-HFP–$LiClO_4$ complexes used in lithium-ion batteries is improved. The second article covers the properties of thin films of PVA-H_3PO_4: 70:30 wt% with alumina nanoparticles.

The topics reported in four other articles include the development of an ion-exchange resin suitable for desalination of water, viscosity modifiers, eco-friendly synthesis of pthalonitrile polymers, and nanocomposites for luminescence applications.

One article proposes a new method to measure surface glass transition temperature $\left(T_g^{surface}\right)$ of thick polymer samples and shows that $T_g^{surface}$ is lower than T_g^{bulk} the glass-transition temperature of the bulk for the four amorphous polymers investigated. In the case of PPO, for example, it is lower by as much as 126°C. This has implications for the mechanism of adhesion.

Crack growth rates of rubber vulcanizates are studied in another article. Another contribution describes the effect of a compatibilizer (maleated polyethylene) on thermoplastic vulcanized polybutadiene/high-density polyethylene and concludes that a 10% addition of this compatibilizer eliminates melt flow instabilities encountered in polymer extrusion.

Solid-state lasers based on dye-doped and silica-dispersed poly (methyl methacrylate) are discussed in another article. This class of nanohybrids incorporating inorganic materials at the molecular level in organic matrices is attracting attention in novel applications in photonics and electronic devices. The behavior of such dye-laser systems with nanosize scatterers is modeled using a rate equation formalism.

In a curious practice, the introductions to each article begin in the form of an abstract. The articles vary in length from five pages to 30 pages and some discussions are sketchy. The title of the volume implies a detailed treatment of polymerization processes and characterization techniques, but such topics are not covered in any depth. A more appropriate title for this volume could have been "Selected topics in polymer science." Many other topics of contemporary interest, such as drug delivery devices and biodegradable polymers might also have been included. However, since the present volume is the first in a series on "Advances in materials science," these subjects may appear in subsequent issues. The volume under review is a good reference work in polymer science.

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