Journal of Applied Polymer Science

Elastomers for the 21st Century

Elastomeric materials, a family of materials that has natural rubber as a highly recognizable member, are all around us, as their applications range among everyday objects such as car tires, sealants, adhesives, shoe soles, and many more. This bewildering variety of uses makes research in these materials of fundamental importance in materials science.

As elastomers enter the 21st century, however, their properties are opening up new applications for them in fields such as biomedical devices, and in turn research to further improve their mechanical and thermal properties is crucial in enabling elastomers to be used in new fields, as well as to perform in established applications. For this reason, work on vulcanization, compounding, blending, and functionalization of elastomers is so important.

Here, we present a selection of articles on elastomers from those we receive at the *Journal of Applied Polymer Science*, focused mostly on synthesis, processing and material properties improvement, as we will examine some of the more current applications such as microfluidics or biomedical implants in future issues.

Vulcanization is the process that transforms a sticky and highly pliable material with poor mechanical properties (whether a natural rubber latex or a synthetic polymer) into a highly useful commodity and engineering material. This can be accomplished through the typical sulfur vulcanization used to create rubber tires, but also to produce novel high-performance elastomers as in the work by Norbert Vennemann et al.[1] Alternatively, different types of vulcanizing agents can be explored, as in the article by Hanafi Ismail and coworkers.[2] Deformation of elastomers can also lead to novel fabrication techniques, as described by Masamoto Uenishi and collaborators.[3]

At the other end of the spectrum, degradation enhancement and stabilization of rubber are also important, and they are examined in the article by Emerson Camargo et al. for photocatalytic processes.[4] An entire new special issue of the *Journal of Applied Polymer Science* could easily be dedicated to the recycling and reutilization of elastomeric material, such as ground tire rubber, and hopefully we will return to this subject in the near future. The research by Binbin Liu and Hua Lei[5] on the improvement of the properties of recycled acrylonitrile–butadiene–styrene copolymers will introduce this important topic in the present special issue.

Composites are an active area of research also for elastomers, as in all polymeric materials, ranging from the reinforcing clay fillers studied by Massimo Messori et al.,[6] to the more complex stimuli responsive magnetic nanoparticles shown in the work of Matthias Mayer et al.[7] Fillers can also be used to improve adhesion performance, as described by Jin San Yoon and coworkers.[8]

The special issue that this editorial introduces shows a broad cross section of research in elastomers. The importance of these materials, and the industrial interest in them, cannot be overstated. Covering all aspects of the field is clearly impossible, but we hope the articles here contained will function as a nice introduction to 21st century research on elastomeric materials and are able to show the breadth of coverage and commitment of the *Journal of Applied Polymer Science* to this important area of research.

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