The Pennsylvania State University

Penn State MATSE News for August 2000

The Department of Materials Science and Engineering
in the
College of Earth and Mineral Sciences

FACULTY NEWS

Polymer--Layered-Silicate Nanocomposite Research Makes *Chemistry of Materials* Cover

A continuing study of the mechanisms of flammability reduction of polymer--layered-silicate nanocomposites that includes **Evangelos Manias,** assistant professor of materials science and engineering, as a co-researcher is the cover article for the July 2000 issue of *Chemistry of Materials.*

The article concentrates on polypropylene-*graft*-maleic anhydride and polystyrene--layered-silicate nanocomposites using montmorillonite and fluorohectorite. The researchers have found evidence for a common mechanism of flammability reduction in the nanocomposites. They also report that the type of layered silicate, nanodispersion, and processing degradation have an influence on the flammability reduction.

The commodity polymers polypropylene and polystyrene are used in nanocomposites in a number of commercial products that must be flame retarded. However, the researchers note that a fundamental understanding of both their unique physical properties and their reduced flammability properties is essential for nanocomposites to succeed as a flame retardant approach for virtually all polymers.

Much of the sample preparation and materials characterization involved in the study was performed at Penn State in the Department of Materials Science and at the Materials Research Institute's transmission electron microscopy facility.

Co-authors on the article with Manias are **Jeffrey W. Gilman, Catheryn L. Jackson, Alexander B. Morgan,** and **Richard Harris, Jr.,** all of the National Institute of Standards and Technology (NIST); **Emmanuel P. Giannelis** and **Melanie Wuthenow,** of Cornell University's Department of Materials Science and Engineering; and **Dawn Hilton** and **Shawn H. Phillips,** of the Air Force Research Laboratory at Edwards Air Force Base, California.

Manias will continue work on optimizing the mechanical and flammability properties of syndiotactic-polystyrene nanocomposites with **T. C. (Mike) Chung,** professor of polymer science at Penn State, through a recent grant from NIST.

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Newnham Delivers Plenary Lectures, Seminars Overseas

Robert E. Newnham, professor emeritus of solid state science, recently delivered plenary lectures on smart materials at the 10th International Metallurgy and Materials Congress in Turkey, and at the Sixth International Congress on Applied Mineralogy at the University of Gottingen, Germany. He also delivered seminars on the future of ceramic engineering and on composite transducers at Anadolu University, Turkey, and at Catholic University, France, respectively. Newnham also presented an invited paper on electroceramics, co-authored with **L. Eric Cross,** professor emeritus of electrical engineering, at the Third Forum of the Academy of Ceramics in Italy.

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Home