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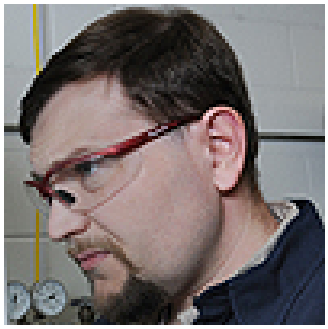
Firestarter

University of Dayton, Ohio (url: http://www.udayton.edu/index.php)



Firestarter

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Alexander Morgan sets things on fire — for a living.

"If I could burn stuff day in and day out, I'd be happy as a clam in mud," said Morgan, an organic chemist and material scientist in the University of Dayton Research Institute (UDRI) who's internationally known as a leading expert in the fire safety of materials, particularly flexible polyurethane foam. He calls this highly flammable material the country's biggest fire problem, and he's leading the way in developing new fire retardant chemicals that will lower the fire risk and be safer for the environment.

"Polyurethane foam is the most flammable thing in your house, and it's everywhere. If the couch or bed catches on fire and you don't put it out quickly within the first five minutes, you can lose your house in minutes," said Morgan, who serves as group leader of UDRI's advanced polymers group.

Under a three-year $300,000 grant from the U.S. National Institute of Standards and Technology, Morgan sets fires in a basement laboratory on campus. Literally.

Using a cone calorimeter device that studies the fire behavior of small material samples, Morgan is assessing the impact of new fire retardant chemicals used in consumer goods — everything from mattresses to laptops. He's testing how quickly a fire can spread out of control, how hot it can get and how clean or dirty it burns.

His work is helping identify safer, more environmentally friendly alternative fire retardant chemicals that allow manufacturers to meet U.S. Consumer Product Safety Standards or federal or state building and fire codes.

Last month, Morgan brought together many of the world's leading experts in the chemistry of fire retardants to deliver their research findings at the American Chemical Society's international conference in San Diego. Morgan shared results on the use of a critical small-scale screening tool to help develop new flame-retardant chemistry for polyurethane foams.

Morgan has edited three books and written 56 peer-reviewed research papers, mostly on polymer flammability and the fire safety engineering of materials, and holds a patent for the use of boron-containing compounds as flame retardants. One of his books, *Flame Retardant Polymer Nanocomposites*, was recently translated into Chinese. He devotes a portion of his time to research for the Air Force, which is interested in thermal protection for hypersonic aircraft, and the rest of his time to helping industrial customers solving their material science problems, both fire and non-fire related.

Before joining the University of Dayton Research Institute in 2005, he spent five years as a research chemist at the Dow Chemical Co., where he initiated a new program in fire safety for plastics. As part of his doctoral work in chemistry at the University of South Carolina, he helped develop fire-safe materials for airplanes under a contract with the Federal Aviation Administration. Later, he won a National Research Council Postdoctoral Fellowship in the Building and Fire Research Laboratory for the National Institute of Standards and Technology.

"Alex Morgan is well respected around the world in the field of fire retardancy. Many of us are experts in fire chemistry or in fire safety engineering, but he has developed expertise in both areas," said Charles Wilkie, a retired Marquette University chemist who specialized in flame retardant research and collaborated with Morgan on books and papers.

Why the fascination with fire? Did Morgan play with matches as a kid?

"I've been burning stuff since graduate school. I like the applied aspect to fire safety research. It's a very noble and ancient profession from a chemistry perspective," he said. "For millennia, we, as a species, have been trying to put out fires as much as we make them. So I enjoy the fact that I not only find the work scientifically gratifying but also get to provide protection against fire for all of us."

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