



## In This Issue...

- ▶ **Bioplastics Gaining Traction**
- ▶ **What Every Polymer Manufacturer Should Know About Shipping Hazardous Materials**
- ▶ **Microparticles/ Microspheres: A New Trend in Plastic Processing**
- ▶ **Benesch Adds White Collar Criminal Practice Group**
- ▶ **Industry Events**

### Cleveland:

2300 BP Tower  
200 Public Square  
Cleveland, OH 44114-2378  
Phone: 216.363.4500  
Fax: 216.363.4588

### Columbus:

88 East Broad Street  
Suite 900  
Columbus, OH 43215-3506  
Phone: 614.223.9300  
Fax: 614.223.9330

www.bfca.com

## Bioplastics Gaining Traction

by John J. Fahsbender

For more than four decades, plastics have been an essential part of our everyday lives. Plastics are used in bottles, containers, paint, batteries, pipes, computers, car parts and many other products in an increasing amount every year. The use of plastics will continue to increase as long as raw materials for making plastics remain affordable. Historically, these resources have been primarily oil and natural gas. As energy prices rise, however, the concept of developing plastics from natural, renewable resources has begun to gain traction.

Biotechnology researchers have developed new ways to create plastics by using alternative available resources, namely plants and plant oils. These new plastics have several benefits. They are made from renewable resources rather than fossil fuels. Many are made from agriculture waste byproducts which are currently thrown away or burned for fuel. Also, some of the new plastics have been designed to be biodegradable. From an environmental regulatory perspective, the manufacture of bioplastics reduces styrene emissions, which are coming under increasingly stricter Federal regulation, and generates less hazardous waste, thus reducing disposal costs.

One type of polymer, lignin, has gained the attention of biotechnology researchers. Lignin is a primary compo-

nent in plant cell walls. It constitutes approximately 25% of wood's content, giving plants strength and causing them to break down very slowly. Lignin can be captured from the wood processing residue of paper production. Currently, the lignin generated in the pulp and paper industry is burned as fuel for further paper manufacturing or transported to landfills.

Researchers have developed a method of grafting lignin that allows water-soluble and plastic graft copolymers of lignin to

**"Biotechnology researchers have developed new ways to create plastics by using alternative available resources, namely plants and plant oils."**

be made. Developers can obtain the lignins from grafting pine through the kraft process. In 1998, chemists created a plastic material composed entirely of alkylated kraft lignin, which is very similar in strength to polystyrene.

The current cost of producing plant-based plastics, however, is relatively high. One barrier to the use of these plastics is the cost of developing the market. Another barrier is the entrenchment of standards for petroleum-based

plastics. To gain widespread acceptance, bioplastics need to compete head-on in price and performance with petroleum-based plastics. Recent advances in technology have produced bio-based plastics that are comparable to petroleum-based plastic, although the price difference remains.

Plant-based plastics are being tested for applications as consumer plastics and as coupling agents in forming wood composites. The materials have also been shown

*Continued on page 2*



to be biodegradable and are being developed as materials for packaging and consumer products. The plant products can be drafted, blended, or surface modified to create plastics with high modulus and strength or polymers with high surface activity. Additionally, bioplastics appeal to environmentally sensitive consumers and industries.

Lignins are also transformed into resins that are used in making, among other things, computer components, automobile parts, and alternatives to wood. A line of thermoset plastic molding resins are filling a market niche due to high performance and long-term cost effectiveness.

The continuing high prices of oil and hazardous waste disposal, as well as the heightened regulatory focus on styrene emissions, are making wood-based lignin an increasingly attractive alternative to petroleum-based plastics. Because of their benefits, wood-based products are gaining a foothold in the marketplace.

For more information, contact John Fahsbender at 216.363.4483 or [jfahsbender@bfca.com](mailto:jfahsbender@bfca.com).

## What Every Polymer Manufacturer Should Know About Shipping Hazardous Materials

By Marc Blubaugh and Kevin Margolis

The manufacturing of polymer products often involves the generation of byproducts that consist of or contain "hazardous materials" such as methane, ethylene, benzene, or acetylene. These materials must be disposed of and transported in accordance with strict international, federal, state, and local regulations in order to avoid exposing you and your company to steep fines, criminal prosecutions, and extensive civil liability. A polymer manufacturer should have at least a basic understanding of some of the legal obligations that arise whenever it makes arrangements to transport hazardous materials from its site.

*How do I know if I actually generate "hazardous materials" for shipment?*

Determining whether or not the various materials that your company manufactures or distributes constitute "hazardous materials" requires that you or someone with appropriate technical background review the complex, comprehensive, hazardous materials classifications contained in federal regulations. New hazardous materials are added to these classifications on a periodic basis. For instance, the polymer industry and government regulators are currently discussing the extent to which fluoropolymers should be classified as hazardous.

*What types of laws do I need to be aware of if I am shipping hazardous materials?*

Once you have determined that your company does in fact generate or ship a hazardous material, you will need to look to international, federal, state, and local laws to determine the business risks that you face. For instance, NAFTA requires that hazardous materials being transported between any member countries must generally comply with the country having the stricter regulations. Likewise, extensive federal regulations govern the interstate transportation of hazardous materials. States and local governments may also issue regulations that further restrict the intra-state transportation of the materials.

*In general, what do I need to do to comply with the federal regulations?*

The federal regulations impose the following seven primary obligations on any shipper of hazardous materials. However, keep in mind that full compliance requires more than a review of this checklist. Among other things, using a licensed carrier having proper insurance is crucial for the purpose of minimizing your possible liability.

### 1. Documentation

You must describe the hazardous material on your shipping paper. This includes identification of a proper name, a hazard class or division, an identification number, a packing group, total quantity, type of packing and destination marks, certain mode-specific information, and an exemption notation if applicable. Much of the specific information that you need to provide can be obtained by referring to the federal regulations once you identify the particular hazardous material in question.

### 2. Certification

You must certify to the public (with very specific, prescribed language) that you are transporting the goods in compliance with the federal regulations.

### 3. Packaging

You must package particular hazardous materials in specific ways delineated in the federal regulations. These regulations take into account the corrosivity, permeability, softening, etc. of the materials in question.

### 4. Marking

You must mark your packages or freight containers in a particular way as described in the federal regulations. These markings must be durable, in English, and printed or affixed to the surface of a package or on an accompanying sign. The type of markings required turns on the nature of the hazardous material as well as the container.

### 5. Labeling

Apart from the markings, you must also label the packages or freight containers. The federal regulations contain a chart that illustrates the shape, size, color, and language required on the particular label necessary for a specific hazardous material.

### 6. Placarding

You must also placard each package, freight container, or transport vehicle.

**"...keep in mind that full compliance requires more than a review of this checklist. Among other things, using a licensed carrier having proper insurance is crucial for the purpose of minimizing your possible liability."**

The form and content of the placard is, once again, specified in the federal regulations.

## 7. Emergency Response/ Security Information

You must be sure to provide information regarding any hazardous material's immediate health hazards and the immediate precautions (including first aid) that should be taken in cases of fires, spills, or leaks. You must also provide an emergency contact telephone number. You are also required to develop a security plan that identifies and accounts for possible transportation security risks related to the hazardous materials that you manufacture or distribute. Among other things, you should be performing proper background checks of job applicants that may ultimately have access to hazardous materials. A federal government website (<http://hazmat.dot.gov/rmsef.htm>) has a template that you may wish to use to help develop your plan.

In short, shipping items that consist of or contain hazardous materials is a necessary part of your polymer business from time to time. Compliance with the complex regulations governing hazardous materials is critical in order to avoid expensive civil litigation and federal regulatory action that can hamper your company's growth.

*For more information, contact Marc Blubaugh (614.223.9382 or [mblubaugh@bfca.com](mailto:mblubaugh@bfca.com)) or Kevin Margolis (216.363.4161 or [kmargolis@bfca.com](mailto:kmargolis@bfca.com)).*

## Microparticles/ Microspheres: A New Trend in Plastic Processing

*By Joseph Crimaldi*

New uses for existing technology can uncover intellectual property issues, specifically patent issues. For example, new uses of microsphere technology may merit a patentability search to more fully comprehend the intellectual property issues presented.

Trends in plastic particle development and processing have recently moved toward more exacting standards of quality control while attempting to increase the percentage of free flowing particles. Established industrial processes do not always meet the exacting standards of modern manufacturing demands due to the varying size distribution as well as the odd shapes (i.e., shapes other than those desired) of particles produced. These properties are detrimental to efficient processing and lead to agglomeration, inexact dosages, abrading with loss of material, or low reproducibility of castings. The use of small and near-perfectly round microspheres with exactly the same size circumvents most, if not all, of the disadvantages that are encountered in processes that rely upon the use of powders and/or granulates.

Numerous methods exist for producing plastic particles with tailored properties, a uniform spherical geometry, and a narrow grain size distribution. In one such method, a liquid plastic is gently pumped through a vibrating nozzle system causing it to break into uniform droplets. The surface tension of these droplets molds them into perfect spheres in which solidification is induced during a short period of free fall. Solidification of the particles can be induced via a gaseous medium through cooling or drying and/or via a liquid medium through cooling or chemical reaction. The amplitude and frequency of the nozzle oscillation or the liquid oscillation are held constant to attain a mono-distribution of the grain size. If desired, the amplitude and frequency of the nozzle oscillation or the liquid oscillation can be modified during microsphere production to yield any desired particle size distribution among the microspheres. This process, as well as others, enables the formation of perfect spherical particles by ensuring that the droplets of liquid plastic are not flattened or otherwise geometrically changed upon entering the cooling liquid.

Microsphere production units range in size from laboratory scale to full size production plants. The throughput and the price of the production units vary depending upon the desired size of the

microspheres to be produced and the complexity involved in the solidification process. Based on a sphere diameter of 1 mm, lab installations have a plastic throughput of about 20 kg/h, pilot plants about 100 to 200 kg/h, and production units can be installed up to 2 t/h. Microsphere production units offer a minimal space requirement (15 to 40 square feet), very low energy consumption, and essentially noiseless operation. Most units operate at atmospheric pressure or slightly above and can be designed to be explosion-proof according to GLP (Good Laboratory Practice) and/or GMP (Good Manufacturing Practice) guidelines as mandated by the Environmental Protection Agency.

Because microsphere production units require very little maintenance, only a minimal staff is required. Units with fully automated controls and remote monitoring can be delivered as an option.

Microspheres produced from molten organics and polymers can be used for dosing, proportioning, compounding, coloring, and light stabilization. Microspheres with dissolved or embedded active agents, with or without a coating or coloring, are used for numerous plastic, pharmaceutical and cosmetic products. Plastic materials like polyethylene, polypropylene, polymethacrylates, polyesters (i.e. most of the thermoplastics), and the non-curing components of thermosetting like novolak and epoxy resins can be granulated to microspheres. Using specifically designed mixtures of organic and aqueous solutions, polyamides, polystyrene and other compounds can be transferred to the interior of the spheres. Microspheres can be produced in a wide range of sizes, with the most popular sizes ranging from 100 microns to 5000 microns, and have a monodisperse grain size distribution. Since microspheres are generally free flowing and roll with practically no friction, there is no abrasion and thus a dust free environment.

Given the increasing tighter demand placed on quality control and the variety of attractive features offered by polymer microspheres, they are sure to be widely

*Continued on page 4*





Continued from page 3

used in the coming years. As such, the ability to "fill" the interior of a microsphere with a wide range of compounds could lead to new uses for previously developed technology. Accordingly, intellectual property issues, specifically patent issues, can arise when known compounds are incorporated into microspheres. Such uses may give rise to new patentable subject matter that would, at a minimum, merit a patentability search to more fully comprehend the intellectual property issues presented.

For more information, contact Joseph Crimaldi at 216.363.4504 or [jcrimaldi@bfca.com](mailto:jcrimaldi@bfca.com).

## Benesch Adds White Collar Criminal Practice Group

Heightened concern among businesspeople over criminal investigations and prosecution has led to the creation of Benesch's newest practice group: White Collar Criminal Defense.

The changing dynamics of law and enforcement actions in the post-Enron environment have increased anxiety levels and raised the stakes for individuals and corporations alike. Companies and professionals who previously had little cause for concern are increasingly being subpoenaed as witnesses or, worse yet, finding themselves the target of an investigation. Enforcement actions by the Securities and Exchange Commission, for example, reached a record high in 2003. Meanwhile, the U.S. Department of Justice and other agencies are aggressively pursuing prosecutions for healthcare fraud, mail fraud, bank fraud, tax evasion, bankruptcy fraud, immigrant violations,

false statements, and other violations of federal statutes.

Typically, the probe seemingly comes out of nowhere and executives are not equipped to prepare a proper response or effective defense. Without counsel, they increase the risk to themselves and their companies.

Companies can, however, reduce their chances of a criminal investigation by reviewing their procedures for preventing fraudulent activity. A preventive assessment can help make sure that proper procedures are in place - and, just as importantly, that they are being followed and enforced.

Our white collar criminal defense practice is headed by Richard Lillie, a former assistant United States attorney and Cuyahoga County common pleas judge. Prior to joining Benesch, Lillie was in private practice, with a concentration on white collar criminal defense, for most of the past 16 years.

Gretchen Holderman has practiced law with Lillie since 1992. She has served as lead and associate trial counsel in numerous federal and state civil and criminal cases and has argued appeals in both the federal and state courts.

Lillie and Holderman have represented individual and corporate clients under investigation by federal agencies as well as various local and state law enforcement agencies. We are proud to have them as part of the Benesch team.

## Industry Events

**June 22-24, 2004**

*Plastics Encounter Midwest, Cleveland, Ohio.*

The Benesch Polymer Law Group was a sponsor of this successful event. Managing Partner and Polymer Law Group member Jim Hill spoke on cross-border mergers and acquisitions in the industry at the event's Management Day Conference.

**September 28-30, 2004**

*Plastics USA, Chicago, Illinois.*

Megan Mehalko, Marc Blubaugh and Scott Harders attended the show.

**February 27 - March 2, 2005**

*Plastics News Executive Forum, Phoenix, Arizona*

In addition to being a sponsor of the Forum, Benesch's Polymer Law group will be presenting during the conference. For additional information and to register for this program, log on to [www.plasticsnews.com](http://www.plasticsnews.com).

## Are You Interested in Receiving Other Benesch Publications?

In addition to the Polymer Advisory, Benesch offers several other publications. To be added to the mailing list for any of the following, please contact Karen Masuga at 216.363.4409 or [kmasuga@bfca.com](mailto:kmasuga@bfca.com). Also let us know of anyone you would like added to the the Polymer Advisory mailing list.

**Benesch Business Bulletin** - timely legal news and court decisions that may affect your business

**China Insights** - a publication for those doing business, or considering doing business, in China

**InterConnect** - a newsletter for both providers and users of transportation and logistics services.

**FOR MORE INFORMATION ABOUT OUR POLYMER LAW GROUP PLEASE CONTACT ONE OF THE FOLLOWING:**

**Allan Goldner**  
Co-Chair, Polymer Industry Team  
216.363.4623  
E-mail: [agoldner@bfca.com](mailto:agoldner@bfca.com)

**Megan L. Mehalko**  
Co-Chair, Polymer Industry Team  
216.363.4487  
E-mail: [mmehalko@bfca.com](mailto:mmehalko@bfca.com)

The content of the Benesch, Friedlander, Coplan & Aronoff LLP Polymer Advisory Newsletter is for general information purposes only. It does not constitute legal advice or create an attorney-client relationship. Any use of this newsletter is for personal use only. All other uses are prohibited. ©2004 Benesch, Friedlander, Coplan & Aronoff LLP. All rights reserved. To obtain permission to reprint articles contained within this newsletter contact Susan Avsec with Benesch, Friedlander, Coplan & Aronoff LLP at 216.363.6129.