

PolymerPlace Notes

A plastics technology newsletter

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What's New At Polymerplace.com

Since the last newsletter we have attended the SPE Plastics Impact on the Environment Conference, the SAE (Society of Automotive Engineers Annual Meeting) and National Manufacturing Week in Chicago. Developments from the conferences and tradeshow will be included in this month's newsletter. We also will include some articles from these events in the April newsletter.

Last month we added a survey capability through the Polymerplace.com site. Please take a moment to answer a few questions that will help us make Polymerplace.com more useful.

Consider joining a focus group. Our focus groups are organized around an area of expertise or interest. From time to time we will ask you to participate in a survey. In exchange for your time you will receive a gift certificate or a chance to win a valuable prize.

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FEATURE STORY -“PERSPECTIVES”

The National Association of Manufacturers held their annual show at McCormick Place March 18-22. The [NAM presented the results of their annual survey of manufacturers](#). Most manufacturers felt that the economy will grow between 2-3% in 2002 however a number of sectors in manufacturing will not keep pace with that growth. In fact four out of ten felt that their industrial sector would continue to experience recession. This confirms that manufacturing's emergence from the prolonged recession will be slower than the rest of the economy.

The respondents also said they would increase their profit margins by introducing new product lines and embracing even tighter acceptance of Six Sigma, or lean manufacturing.

Nonetheless, manufacturing hours are increasing and more overtime is occurring. The growth in the first quarter reflects an inventory rebound. With new capital spending incentives, manufacturing will pick up.



Dean Kamen, the innovative inventor and chief executive of the company who designed the [Segway Human Transporter](#), shared an interesting idea during his presentation at the NAM conference. He felt that manufacturing companies need to identify the “Michael Jordan”s of engineering and technology. Engineers are largely responsible for the standard of living we enjoy today in America but it is sports celebrities and movie stars who are held up for young people to emulate. We need to look in our companies and identify engineers who are advancing the field and should hold them up as role models for young people to emulate. Our country needs to recognize the importance of technology and retain our lead. If the youth of America does not have a positive view of manufacturing including plastics they will seek other careers.



By the way, the Segway Human Transporter is an excellent case study on multi-company collaboration on a new product design. The transporting device, looking a bit like a sophisticated motor scooter, allows passengers to travel as fast as 12.5 miles per hour. The brakeless device contains an electric brain and tilt sensors that start, stop and turn the HT with a user's center of gravity. The device utilizes plastics in the battery box, user interface and tire and wheel assembly. For more information, [Plastics News](#) has an article in the March 18th issue on the Segway project.

Polymer End Use Markets

Transportation

[GE Plastics has taken the sophistication of color a step further with its line of Visualfx resins](#) that are formulated with the color and desired effect in the resin pellet. This approach could eliminate secondary paint and coating operations. At the SAE World Congress & Exposition March 5-7, GE Plastics introduced what it calls an exclusive 2002 color and effects guide based on its Visualfx resins and developed by the fashion and aesthetics forecaster Agence de Style Peclers of Paris.

According to GE's North American plastics marketing program manager for aesthetics, "The Peclers color and effect guide represents the voice of 1,000 customers. It predicts consumer desires for manufacturers and designers. It answers the questions: What will be the effects and

colors of tomorrow. With this in mind, GE introduced early this month a portfolio of resins that it believes meet these criteria. The names of the colors are somewhat unusual consisting of Enyo, Lustre, Glass, Make-Up, Smoke and Frost. "Enyo" is a polycarbonate (PC) resin with the appearance of tiny crystals and dramatic color changes with effects moving through a spectrum of colors as the viewing angle changes. "Lustre" is pre-compounded PC resins that exhibit an elegant pearl finish with a shiny, translucent base in soft pastel pinks and whites. "Glass" is available in ABS and PC resin and simulates the appearance of stained glass or gems with deep transparent colors. "Make-Up" resins are available in ABS/PC resins that apply rich color and subtle sparkles for a "voluptuous", satiny appearance. "Smoke" resins are available in PC and offer a sheer, transparent look. And "Frost" is also a PC resin that is said to capture the power of arctic light with subtle hues of pale, translucent color with no sparkle or sheen.

For more information on these resins, go to www.gevisualfx.com.



At the **Society of Automotive Engineers World Congress** (Mar. 4-7), **Delphi introduced a new class of thermoplastic elastomer blends** that are being evaluated as barrier materials to high heat and fire conditions for underhood, cockpit, and exterior applications such as fire shields for fuel tanks, bulkheads, and wheel well covers. A paper presented at the SAE described field testing involving large fuel pool fires, engine compartment fires, and other tests for various applications proved that the material is very effective as a fire shield. The novel TPEs are intumescent, i.e., they expand and form a sponge-like char when exposed to fire. As a result, they function as a heat-resistant barrier that reduces the transfer of heat to nearby objects and reduces the progress of fires, according to Ismat A. Abu-Isa, author of the paper. Large-scale production technology has been developed for the new TPEs, according to Delphi. The Delphi intumescent material is based on high-density polyethylene as the hard phase of the TPE and chlorinated PE and/or silicone rubber as the soft phase. The composition also contains fillers, thermal stabilizers, fire retardant additives, blowing agents, and char-forming additives. Laboratory testing has demonstrated that the intumescent TPEs have good mechanical properties, chemical resistance, and sound insulation properties. According to the company, the new fire-resistant TPE can be processed by all standard techniques. High-molecular-weight/high-melt viscosity grades can be used for blow molding, low-melt viscosity grades are geared for injection molding, and intermediate viscosities can be tailored for extrusion applications, according to Delphi. "The intumescent material presented could be used to replace existing plastic parts in cars, or as a cover layer or shield to protect other plastic parts," says the study. "Similarly, it can be used to manufacture components for other industries, such as transportation, shipping, industrial and residential buildings, and office and home furniture." Other intumescent materials are commercially available, according to Delphi, but they are limited to coatings or paper-like composite products.

Delphi subsequently evaluated the recyclability of the TPEs, first finding that parts made from 100% regrind showed no difference from virgin material. The company then examined whether regrind from HDPE fuel tanks could be used to make the intumescent TPE, testing recycled material exposed to various fuels. "For samples made of the unexposed regrind, and regrind exposed to gasoline, the properties are similar to that made of virgin HDPE," says the report.



One of the busiest exhibit booths at the SAE World Congress and Exposition was the Owens Corning Automotive booth. On exhibit was a **new proprietary thermoplastic composite developed by Owens Corning and DSM Automotive Polymers**. Demonstrating its success is the already successful BMW Mini-Cooper with a front-end module made from the new composite. The new composite is called StaMax and it is believed to be an extension of long fiber reinforcement technology using polypropylene resin. Parts made from the process are reported to be very rigid, lightweight and processable on conventional equipment.

DSM says the primary applications for its StaMax resin include door structures, instrument carriers, splash shields, bumper beams and integrated front-end systems where it has been used on the Mini. It is reported to offer lower system costs and weight than GMT (Glass Mat Thermoplastics), which might explain its early acceptance at BMW.

Packaging

Eastman Chemical Company has announced the introduction of [EASTAR BIO Ultra copolyester, a new entry in its line of EASTAR BIO biodegradable resins](#).

EASTAR BIO Ultra copolyester features a higher melt viscosity than its sister product, EASTAR BIO GP copolyester. "EASTAR BIO Ultra with its higher melt viscosity is engineered specifically for the rigorous demands of blown film processing, permitting higher throughputs and improved processability," said Julian Jensen, Eastman's business market manager with responsibility for the biodegradable product line.

"Extrusion processing conditions will be similar to a high melt index low density polyethylene (LDPE)." Engineered to be durable for its useful life, EASTAR BIO Ultra completely biodegrades to carbon dioxide, water and biomass in 180 days in a commercial composting environment. It will become invisible to the naked eye in as little as twelve weeks, a time frame comparable to paper in the same environment.

Film made of this copolyester is strong, moisture-resistant, durable outside a composting environment and provides good tear and puncture resistance, particularly at lower temperatures. Applications for the product include agricultural films, lamination films for rigid food packaging, leaf and lawn waste bags and horticultural applications.

EASTAR BIO Ultra copolyester is approved for food contact in the European Union and the U.S. and fully meets ASTM and DIN standards for biodegradation. For more information contact 1-800-Eastman.

Construction

Dow BioProducts Ltd., a business formed by Dow Chemical last year following its acquisition of Isoboard Enterprises, has begun shipping its first commercial quantities of [fiberboard products manufactured from wheat straw and a polyurethane binder](#). Dow has trademarked the product with the name "Woodstalk" and will position the product to compete with other products in the wood-based panels industry. Dow says its product can typically replace particleboard, medium density fiberboard, oriented strand board and plywood. It's producing panels for underlayment, finished shelving and attic storage along with industrial products used by fabricators to make kitchen cabinets, millwork and furniture.

Dow's Woodstalk products are all produced from renewable wheat straw at a 215,000 sq.ft. plant in Elie, Manitoba.

Wire and Cable

Paula Hubbard, global marketing manager for Dyneon's wire and cable products claims that they are seeing [increased demands for fluoropolymers in many wire and cable end-use markets](#)- trends in automotive that require higher temperatures, increased flexibility and good abrasion resistance, trends in datacom with increased demand for better electrical performance and trends in appliance wiring requiring higher temperature resistance. According to Hubbard, many of the emerging electrical, temperature and safety performance challenges that are facing wire and cable products can be solved through the use of fluoropolymers.

Dyneon is now offering a unique product for automotive and aerospace wiring that offers performance that is a notch higher than ETFE (ethylene tetrafluoroethylene). HTE is reported to offer similar abrasion resistance and cut-through to ETFE, but it can be processed on standard extrusion equipment and it offers a higher LOI (Limiting Oxygen Index) than ETFE.

A new terpolymer available from Dyneon is THV (tetrafluoroethylene, hexafluoroethylene and vinylidene fluoride) which claims to be one of the most flexible fluoropolymers available with a flexural modulus of 16,000 psi. Dyneon offers this material in ultra high purity form to prevent outgassing and making it ideal for use in semiconductor equipment.

Dyneon is also at work in the lab developing new foamed products for communications applications where cost and weight are becoming key issues.

For more information on Dyneon's wire and cable products, call Doug Chirhart at 651 736-9241.

Industrial

Quadrant Engineering Plastic Products, Reading, PA and The Advanced Products Company, North Haven, CT have formed an [alliance for the development of materials and solutions for severe-service sealing applications](#). The union of the two leaders in their respective industry brings together the extensive high-performance materials technology of Quadrant EPP and Advanced Products long-proven engineering and testing expertise in seals for extreme environments.

Quadrant will promote Advanced Products as a market development partner for finished-sealing components and systems using its materials, and provide Advanced with targeted product development and market development support. The company was formerly DSM Engineering Plastic Products, which acquired Polymer Corporation and ERTA, two leading worldwide producers of engineering plastics for machining.

Advanced will provide specific market development support and product technology direction for Quadrant's materials development team in addition to promoting Quadrant's materials as an integral part of their extreme-environment sealing components.

Markets expected to benefit from this unique alliance are: aerospace, chemical processing and production, semiconductor manufacturing, turbo-compressors, oil and gas industries, mechanical sealing and industrial process equipment. The joint efforts of Quadrant and Advanced will focus on North America and Europe. Plans are being readied for similar efforts in the Asian markets.

Glen Steady, President of Quadrant Engineering Plastic Products - Americas, said, "The alliance with Advanced Products is our latest step in advancing our high-performance engineering plastic products for machining and fabrication of seals. Quadrant has an extensive background in polymer materials for the seals market. We look forward to working with Advanced Products to build on its market leadership in this growth industry."

Peter Amos, V-P Sales and Engineering of Advanced Products, said, "We see great potential in being part of an alliance with a materials company specifically focused on providing high-performance plastics for extreme-environment seals. Concentrating on the needs of the extreme-environment seals market has been a major factor in the growth of our own business for many years. Now, we will be able to draw upon the ingenuity of Quadrant Engineering Plastic Products. The synergies of our materials, processing, product and market technologies will allow us to provide unique benefits to potential customers worldwide."

Visit Advanced Products website at www.advpro.com or learn more about Quadrant at <http://www.quadrantepp.com>.

New Polymeric Materials

[Atofina Petrochemicals commercialized syndiotactic polypropylene \(sPP\)](#) earlier this month. To be sold under the Finaplas trade name, the polymers have an altered molecular configuration that provides a unique set of physical properties and enhances clarity and gloss. They were developed to be much softer than conventional isotactic polypropylene with a melting temperature of 128C (262F) and low extractables. sPP has been in development for a decade.

The major market for these new polymers is expected in packaging films. "Some of the main benefits of Finaplas propylene polymers include expanding the range of film shrinkage, improved formability on containers, and improved clarity in cast and oriented films compared to other polymer options," advised Phil Carruthers, v-p for Propylene at Atofina. He predicted that sPP will replace paper and other converted films in difficult container designs, allowing packagers to develop more uniquely shaped containers in order to increase shelf visibility and attractiveness.

Carruthers forecasts that other markets could include use in TPOs and other polymer blends where sPP enables better dispersion of pigments in color concentrates, improve processability and produce parts with higher gloss. In injection molded durable products sPP is reported to produce parts with more intense and brighter colors. than conventional isotactic PP. Work is also underway in developing lower melting point grades that will produce softer polyolefins for elastomer and plastomer applications. These could develop into replacements for plasticized PVC.

For extruded foams, Atofina is working to develop grades with improved acoustical properties with good elastic recovery and experimentation is being done with a polar molecule such as maleic anhydride for use as a compatibilizer, and as an additive that could be used as a tie-layer between dissimilar polymers. Atofina also sees possibilities for using sPP in hot melt and solvent-based adhesives. Atofina says it continues to develop new grades and expects to offer higher melting point products for use in medical sterilizable applications, noting that sPP is significantly more irradiation stable

For more information, contact David C. Anderson, Market Development Manager at 281 227-5266 or send e-mail to david.Anderson@atofina.com.



Ticona, the technical polymers business of Celanese AG (NYSE: CZ), has introduced Celcon[®] CF802 acetal copolymer, a fiber-reinforced grade having electrical dissipation capabilities. This grade, which has a static decay time of less than 0.01 sec. and a surface resistivity of 10^3 ohms in as-molded components, is a good candidate for use in automotive fuel systems, material handling systems and wherever static charge build-up is a problem.

Celcon CF802 acetal copolymer meets the requirements of the Federal Test Method for Electrostatic Properties of Materials (FTM 101C, Method 4046) and the SAE J1645 Fuel System Electrostatic Charge Standard. It is also approved under General Motors material specification GMN 7830P-POM-041.

The new grade is made with proprietary Ticona technology that forms a tight bond between the fibers and the acetal matrix. This technology allows the acetal to accept fiber reinforcements and still have physical, mechanical, flow and other properties similar to unfilled acetal, e.g., a tensile modulus of 2,790 MPa and a notched Charpy impact strength of 4.5 KJ/m². The new grade also has excellent chemical resistance and dimensional stability.

In addition Celcon acetal copolymer is widely used in automotive fuel applications. A recent 5,000-hour study by Ticona of how commonly used fuel system plastics age when exposed to nine auto fuel blends found that Celcon acetal copolymer was more resistant to oxygenated and non-oxygenated fuels than acetal homopolymer, polyester and aliphatic polyketone at temperatures found in fuel tanks and outside the engine compartment.

Celcon[®] CF802 dissipative acetal copolymer data sheets are available online at <http://www.ticona-us.com/datasheet/DataSheet.cfm?ID=907&STANDARD=ISO>.

Ticona's 5,000 hour study of the effects of fuels on various plastics is available at http://www.ticona-us.com/Literature/documents/Fuel_Brochure_01_300res72dpi.PDF For more information on Celcon[®] CF802 dissipative acetal copolymer and other Celcon[®] grades, please contact: Dwight Smith, Ticona Application Development Center, 2600 Opdyke Road, Auburn Hills, MI 48326. Phone: 1-800-962-7448 (x-6857). E-mail dwight.smith@ticona.com. Or visit www.ticona.com.

Process Developments- Recycling

Melbourne Australia-based Ozmotech Pty. Ltd. has established what it touts as [the first plant in Australia to convert waste plastic to diesel fuel](#). The plant uses thermalysis technology from Kelso, Wash.-based Environmental Fuel Development Co. Ozmotech claims they can process 14,000 pounds of waste plastic a day, converting it to about 2,000 gallons of diesel. He said the plant will help reduce the amount of non-biodegradable plastic going to landfills.

The plant converts unwashed, unsorted scrap and post-consumer plastics. The plastics are heated and the resulting gases are condensed. The end result is diesel with a low sulphur content. "With a production efficiency of up to 99.58 percent, the resultant diesel output almost equals the waste material input," the spokesman said.

The first plant will convert waste plastics from companies in Victoria, Australia, and landfills. Additional plants may be installed in Sydney, but no time frame has been set, the spokesman said.



[Chrysler Group's CARE Car II](#) program has taken recovered plastics from Auto shredder residue and converted them into a valuable product while potentially saving the automobile industry \$320 million per year. The program was a highlight of the 2002 SPE Global Plastics Environmental Conference held in Detroit February 13-14.

The CARE Car II is the second phase of the Chrysler group's CARE (Concepts for Advanced Recycling and Environmental) Car demonstration program. The goals of the program are to increase the recyclability and recovery of automobiles to about 95 percent by weight and increase the use of recycled materials in production vehicles.

Chrysler Group worked with 26 production suppliers and Salt Lake City based Recovery Plastics International (RPI), to retrofit two Jeep Grand Cherokees with 54 recycled plastic parts. Chrysler Group was the first automaker to use RPI's proprietary plastic flotation technology to separate the myriad of plastic types found in automotive shredder residue -- which currently goes to landfill -- and use the recovered plastic to manufacture new vehicle parts.

The recycled parts meet the same material specifications required for production vehicles and were manufactured by the Chrysler Group's production supply partners. The suppliers used current production molds and processes to produce the parts -- at a lower cost than using virgin plastic. Chrysler Group estimates that the recycled plastic can save \$10 - \$20 per vehicle.

About 95 percent of all automobiles are recycled. However, recycling has been limited in the past primarily to the metallic components. We will include more details on this project in the April newsletter.

Tooling

[A partnership between a tooling and components supplier to the injection molding industry and a manufacturer of hot runner systems](#) promises to bring a new level of process control within the mold. PCS Co. of Fraser, Mich., a supplier of tooling for IM, and Caco Pacific Corp. of Covina, Calif., a maker of hot runner systems, are introducing a line of high performance molds equipped with Caco hot runners and Caco's IPM Controllers that provide a level of mold control they claim was not possible until now. Using Caco's Interactive Process Manager and hot runner systems, these novel molds now have the capability to control temperature, control sequences, process monitoring, molding conditions and set-up parameters, all the while communicating key information such as process parameters, alarms and status updates to monitoring equipment and auxiliaries.

Caco has patented its bolt on hot runner systems using its IPM controllers for its own molds and says the systems are proven under a variety of gating techniques including valve gates, hot-edge gates, hot tip, open sprue and special custom styles. The controller allows the molder to restrain the actions of other equipment until the mold has reached proper operating conditions, which reduces the chances of producing sub-standard parts during the warm-up period or damaging the tool.

The system is reported to be compact with capability for mounting on top of the mold with no bulky heater or thermocouple cables. All heaters are brought up to set temperature together to reduce thermal stress and an internal modem communicates all controller operations.

For more information, contact Dwight Zahringer at PCS Co. at 800 521—0546 or visit their web site at www.pcs-company.com.

References: The stories in *PolymerPlace Notes* come from a variety of sources including Company Press Releases, Interviews, and trade publications, e.g. *Plastics Daily News*, the National Manufacturing Week Show Daily, the SAE 2002 Show Daily and *Plastics News*.

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