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POLYMERPLACE NOTES

A plastics technology newsletter

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Process developments

- Dow is also developing color capabilities
- GM received the SPE's Excellence in Plastics Impact on the Environment

WHAT'S NEW AT POLYMERPLACE.COM?

Polymerplace.com will be presenting a keynote presentation at SPE ANTEC 2002 in San Francisco, California. The title of the paper is Product Design Advances through Plastics. The objective of the presentation is to present examples of innovative products that have been possible through plastics technology. We will be posting the presentation on the PolymerPlace site sometime in May. Please take a few seconds to fill out our survey so that we may continue to improve PolymerPlace.com. Also consider joining a focus group- from time to time we would like your opinion. We are promoting our survey service to our current clients and visitors to the site. We will organize our focus groups by interest area. We would like to hear from you!

FEATURE STORY

Manufacturing Activity appears to be increasing in 2002

National Manufacturing Week (March 18-21, 2002) was not as well attended as hoped however the people who did attend were decision makers or influencers. We can conclude from this that the last year's drastic economic climate caused companies to cut back in staff and expenses. Companies have become more selective as to who attends shows and those attendees have more responsibility. There also was a degree of optimism detected at the show.

According to *The Economist,* America's industrial output, measured against each previous month, had decreased for 15 consecutive months from November 2000 to January 2002, the longest unbroken fall since 1932. At last in February 2002 this prolonged freeze thawed. February and March both saw increases in Industrial output. This was a tremendous relief to everybody connected to manufacturing. The Institute for Supply Management's (ISM) index is one of the most widely respected indicators of confidence levels in U.S. manufacturing. Index levels that are below 50 indicate shrinking factory activity while readings above 50 signal a rise. In October 2001 the index sank to 39.8, the lowest level since Feb. 1991. In Feb.2002 the index surged to 54.7.

According to the Manufacturing ISM Report on Business, overall activity in the U.S. manufacturing sector grew for the second consecutive month in March. Three out of every four manufacturing industries that were surveyed for the report, including the plastics sector, registered growth compared to February. Specifically, plastics manufacturers posted advances in new orders, production, backlogs, and export orders. Plastics managers also reported paying lower resin prices for the second consecutive month. This downtrend in prices is expected to be short-lived however, as rising energy costs and increasing demand are expected to put upward pressure on resin price tags as the expansion in the U.S. economy progresses.

The overall PMI for March was 55.6%, an increase of 0.9-percentage point from the 54.7% reported in February. The latest PMI indicates that the U.S. economy and manufacturing activity is accelerating compared to February. Overall manufacturing employment levels, a lagging indicator of economic activity,

continued to decline in March, but at a much slower rate than the previous month. In other economics news, the Commerce Dept. recently reported that construction spending increased by 1% in February compared to the previous month. So far in 2002, the strongest sectors have been private residential construction - new houses as well as remodeling - and virtually all types of public construction. The private residential construction sector is the major end-market for plastics building materials such as pipe, siding, windows, wire, and decking.

POLYMER MARKETS

Transportation

A new process developed by Siemens' VDO unit uses polyurethane backing on leather to produce a more durable and more comfortable seat. The novel process was developed as part of program that has Siemens delivering a cockpit and center console module to the Land Rover plant at Solihull, Great Britain. The cockpit and console are produced at Siemens VDO's Holford facility in England and delivered as a fully functional ready-to-install module complete with wiring harness and more than 300 individual parts.

Key among those parts are the seats for the new Land Rover, where instead of adopting the traditional method of gluing the leather directly to the foam, Siemens VDO applies a flexible foam layer to the back of the leather. The thickness of the foam is varied to optimize cushioning effects and to enhance the feel of the leather material.

Siemens worked with BMW engineers in Munich in designing the interior and the processes used to assemble the huge module. BMW insisted in giving customers the ability to design their own Land Rover and provide them with variations in design and equipment. The console, for instance, can be ordered in wood, metal or plastic and can be combined with various leather finishes. Siemens was forced to develop processes that allow that kind of manufacturing flexibility and still be able to deliver as many as 300,000 cockpits a year.

Appliance

The appliance industry after many years of dull growth broke sales records three years in a row beginning in 1998. Last year the boom ended. The **Association of Home Appliance Manufacturers has released shipment figures for 2001** and while they're a far cry from recent past years, they're not as bad as they could have been. Shipments of all major appliances totaled 64.6 million units, down 0.6% from the previous year. Shipments of cooking appliances actually rose slightly with 21.5 million units shipped, that's up 3.4% from 2000. Home laundry appliance and kitchen clean-up appliance shipments fell 1.5% and 1.2% respectively with about 14 million laundry units and 11.4 kitchen units shipped. Surprisingly food preservation shipments were up 3% over the previous year with a total of 11.5 million units, but not because of shipments of refrigerators. They increased only 1% over 2000 while shipments of freezers after the events of September 11 rose dramatically with shipments in November and December about 45% higher than the previous year. For the year, freezer shipments finished 12.8% higher than 2000. Home comfort appliances finished the year

with a total of 7.5 million units shipped that was down 14.6% from the previous year.

Packaging

Plassein International (Willington, CT) is a leading provider of application films for a number of industries. They work closely with design engineers and flexible packagers in a number of niche markets such as construction, agricultural, food and industrial. Their capabilities include advanced co-extrusion, innovative design, premium printing and converting. During National Manufacturing week they announced a couple of new products including **custom color matched flame retardant films and corrosion inhibitor films, bags and liners.** Color matching accuracy makes their FlameX™ films ideal for furniture, automobile, aviation equipment, and building supply applications. Metal products and parts remain well protected against corrosion and rust during transportation and storage by using Plassein's VCI (volatile corrosion inhibitor) films, bags and liners. The VCI films are ideal for shipping and storing ferrous and non-ferrous metals such as aluminum, steel, iron, bronze and galvanized products. The VCI films are an integral part of Plassein's barrier protection line.

For more information, contact John Strasburg at 866-PLASSEIN or e-mail him at:jstrasburg@plassein.com.

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DuPont and EarthShell Corp. have announced the formation of a strategic alliance under which DuPont will lead the development, marketing, production, and distribution of biodegradable film products that combine its Biomax polyester with EarthShell starch and limestone-based materials.The companies collaborated a year ago to determine the viability of EarthShell-based food-service products employing hydro-degradable Biomax coatings and films as the exterior, protective surface. They have now determined that Biomax provides better barrier performance over a range of EarthShell applications than other coatings or films. Under the alliance, DuPont and EarthShell have signed a non-binding letter of intent to license EarthShell flexible food-service wrap technology exclusively to DuPont. The deal also allows for future expansion to other EarthShell technologies and products, such as disposable bowls, cups, and plates.

David Ferretti, global business manager for DuPont Packaging and Industrial Polymers, says his company will draw on its strong applications development capabilities and broad market access to expedite the commercialization of Biomax/EarthShell products.

Information Technology (IT)

Dow introduced the Emerge™ line of PC resins in 2000 to help its customers achieve improved performance and aesthetics while reducing overall costs. Emerge PC 8600 resin introduced this year is the first ignition resistant polycarbonate resin in the product line. **Emerge PC 8600 uses a proprietary flame-retardant technology to provide superior ignition resistance** (UL 94 V-

0 at 1.5 mm and 5VB at 2.5 mm) without the use of halogen or phosphate additives. Dow testing has shown resins employing this technology provide better thermal and light stability than resin with brominated-flame retardants and improved impact strength and heat distortion temperature versus phosphorus containing materials.

Emerge™ PC 8600 resin allows customers to meet compliance standard of all known global environmental label requirements, such as TCO or Blue Angel. Because the product is fully compatible with all standard electronic waste and recycling management practices, it also offers a number of waste management options.

Emerge PC 8600 resin is ideal for laptops, desktop computers, monitors, peripherals and plastic housings for other electronic equipment.

For more information: visit www.DOWEP.com or contact Dow in NA at-441-4369 (1-989-832-1426)

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NEW POLYMER DEVELOPMENTS

Bayer has recently introduced a new grade of its BKV 30 HTS (high temperature stabilized) nylon that the company claims **is opening new doors for nylon applications under the hood of cars.** Suitable for continuous use at temperatures as high as 320 F (160 C), BKV 30 is 30% glass reinforced and stabilized by combining special additives that Bayer reports assures the copper-based stabilizer is released more slowly than in nylons stabilized under conventional copper-based methods.

An automotive intake manifold produced from BKV 30 HTS was tested for 3,000 hours of constant running at a temperature of 302 F (150 C) and was found to have lost only half of its Izod impact strength at the end of the test. Bayer equates this to driving a distance of 150,000 km non-stop.

For more information on BKV 30 HHS, contact Bayer at +49 221 9902 160.

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New from Ticona, Summit, N.J., are **eight grades of its Celanex PBT that resist the effects of high temperature and humidity** and provide improved retention of elongation at break, tensile strength and other mechanical properties. Available in both filled and unfilled grades, Ticona says these PBT grades offer improved performance over standard grades in automotive connectors and other applications where heat and humidity are factors. Ticona reports that it has evaluated the new grades and confirmed that they comply with USCAR's (United States Council for Automotive Research) Class II and Class III testing for automotive connectors. The protocol – USCAR-2v section 5.6.2 – classifies performance of parts exposed to conditions that cause hydrolysis. Ticona reports that its new hydrolysis- resistant grades passed the Class II and Class III tests, which are conducted at 120 C and 145C peak temperatures respectively. These grades are now being screened at USCAR Class IV requirements at 175C.

The new grades include Celanex 2003HR, an unfilled grade, and filled grades 3200HR (15% glass- fiber) and 3300HR (30% glass-fiber). Grade 3109HR and 3309HR are non-lubricated grades with 7.5% and 30% glass fiber reinforcement respectively. Grade 3309HRT is a toughened grade with 30% glass-fiber and 3325HRT is a 30% glass-filled, toughened hydrolysis- resistant grade with improved elongation at break. Celanex 6407HR is a 30% glass/mineral-filled warp resistant grade.

For more information on these new grades from call 800 833-4882 or visit their web site at **www.ticona-us.com**.

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Bayer AG has introduced what it describes as a new generation of flame retardant polymer blends based on PC (polycarbonate) and ABS (acrylonitrile-butadiene-styrene). The new grades are derived from novel nanotechnology that keeps the flame retardant entirely within the polymer matrix during processing, thereby optimizing its effect in the end part. Bayer has received a patent on the proprietary technology. Bayer says the new FR grades are chlorine- and bromine-free and they can be used for a variety of applications, including thin wall molding and high temperature applications. Bayer is offering grades suitable for injection molding, extrusion and thermoforming. The materials are reported to have excellent flow with a UL 94 V-0 classification at 0.75 mm plaque thickness.

For more information, visit **www.Bayer.com** .

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At National Manufacturing week, **Solvay Advanced Polymers introduced a new grade of Torlon™ Polyamide-imide(PAI)**. The new material designated Torlon 4435 is specifically designed to provide exceptional wear performance in non-lubricated, high-PV applications. Not only is Torlon 4435 particularly suited to applications where lubrication is impossible or undesirable, it provides an additional margin for the continued operation of lubricated systems in the event that lubrication is lost.

A high PV environment is one in which the pressure on a moving part multiplied by the part's velocity results in a composite measurement (PV) in the range from 50,000 to 100,000 psi-ft/min. Typical applications that operate in this regime are rotating or sliding components fo automotive and industrial machinery, such as bearings, bushings, seal rings, wear pads, and piston rings.

Initial testing has demonstrated that parts made of Torlon 4435 exhibit excellent wear resistance across the complete envelope of non-lubricated high PVs-from low pressure-high velocity conditions (125 psi 800 ft/min) to those of high pressure and low velocity (2000 psi and 50 ft/min). Polymers that can operate in this extreme environment can save both cost and weight as replacements for the metal parts traditionally used in such applications.

The key to the durability of Torlon 4435 is its ability to maintain its good mechanical properties at high temperature. The glass transition temperature of this new polyamide-imide material allows parts to operate continuously at temperatures up to 260 degrees C.

By comparison, two other materials often specified for stress-and –motion applications have some shortcomings in extremes of temperature and pressure. Polyetherketone (PEEK) tends not to survive in conditions above 75,000 PV without additional lubrication, because their mechanical properties are seriously compromised at heats above the glass-transition temperature of 145 degrees Conventional Polyimide materials, while they have excellent wear characteristics, can lack sufficient mechanical strength to maintain integrity under non-lubricated, high-pressure conditions.

An additional feature and benefit of the new Torlon grade is that it is thermoplastic and can be formed to near net shape by injection molding.

For more information, contact Marla Witbrod of Solvay Advanced Polymers LLC, witbromc@bp.com.; phone: 770-772-8451

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Noveon brings designers unprecedented adhesion capabilities in **soft-touch overmolding with its Estagrip™ TPE engineered plastic system**. The innovative technology permits the use of soft-touch overmolds in even the most demanding applications- without adhesive failure.

The Estagrip™ system unites soft, flexible overmolds with rigid substrates including styrenics, vinyls, polycarbonates, polyesters, polyurethanes and alloys. In applications where adhesion can be problematic and require a high modulus substrate- where filled polyolefins or polyamides might initially be selected- looking at the Esta-grip ™ RS-series with similar modulus performance would resolve adhesion concerns and provide a more dimensionally stable product as well. High-abuse products such as hand and power tools, consumer, and recreational goods could benefit from such technology. For more information, contact Noveon at 888-234-2436 or visit **www.estagrip.com**

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Today's consumer demand products that reflect their individuality and that means they want product in an ever-changing array of colors and special effects. Last month we wrote about GE Plastics initiative in the color area.

Dow is also developing color capabilities ideally suited for Information Technology Equipent (ITE) market segment. It will also offer benefits for appliance, automotive and other consumer goods.

Dow's global color capabilities include: Global Color Development Laboratories. At these centers in Treneuzen the Netherlands and Midland Michigan, customers can work one-on one with Dow coloristrs to choose, customize and event colors. To support Customers' color needs worldwide, Dow also has color-matching facilities in Hsinchu, Taiwan and Clinton, Tenn., USA.

Dow offers special effects such as metallics, glitters, fluorescents, translucents, color shifting, marble, pastels and more. The full line of effects will be announced some time this year.

In addition to a comprehensive range of pre- colored materials, Dow offers an alternative. Dow's exclusive PROMATCH Self-Coloring service. This helps

manufacturers and molders lower their costs, improve productivity and increase competitiveness by converting to a self-coloring process for molding parts for a wide range of applications. By allowing for the production of plastic parts by combining natural resins and color concentrates at the molding machine, PROMATCH service improves speed to market and keeps inventories low resulting in potentially significant cost savings. For more information, visit **www.DOWEP.com**.

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Ford Motor has worked hard to be the greenest of the Big Three automakers over the last few years, and now General Motors is being recognized for its efforts. **GM received the SPE's (Society of Plastics Engineers) Excellence in Plastics Impact on the Environment** Award for its use of recycled plastics on its vehicles, and in particular, for its design initiatives on the 2002 Chevy Trailblazer. In making the announcement Dr. Pallatheri Subramanian, Awards Chairperson for the SPE's Environmental Division highlighted some of GM's other achievements in designing and assembling the Trailblazer. Among them Subramanian noted a new hydroforming frame and radiator support process that relies on fluid pressure to shape parts, reducing scrap steel and reducing noise on the plant floor. G.M. is also using a new water-based e-coat on frames, which is cleaner than conventional oil-based coatings. Radiator side air baffles use 3,700 recycled tires per model year and G.M. has moved to compressed gas technology to inflate its air bags, moving away from the use of sodium azide. G.M. is also credited with increasing the fuel economy of the Trailblazer by 0.65 mpg in the 2002 model year and eliminating 180 wiring circuits in the electrical system that saves copper and increases functionality.

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*, and *Plastics News*.