

## **PolymerPlace Notes**

*A plastics technology newsletter*

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### **HIGHLIGHTS THIS MONTH**

- Busy month for plastics related conferences
- New Biotech newsletter

### **POLYMER MARKETS**

- **Automotive:** North American Auto Show
- **Packaging:** Hefty<sup>®</sup> Slide-Rite<sup>®</sup> Advanced Closure System has been extended to encompass first-time zipper closures for commercial sliced meat and animal crackers.

### **MATERIAL DEVELOPMENTS**

- Dow Chemical introduced a new line of materials called Versify™ plastomers and elastomers.

### **PROCESS DEVELOPMENTS**

- “Pushtrusion” is the trademark of a new, patented technology that will revolutionize the production of long glass reinforced parts via direct molding.

### **BUSINESS MODELS**

- At the recent *Plastics News* Executive Forum February 1-3, 2004 a lot of the presentations observed that we are in the midst of a structural change in the plastics industry.

### **What's Happening at Polymerplace.com**

February 2004 was a busy month for us. We attended the *Plastics News* Executive Forum in North Las Vegas, the GPEC 2004 (SPE) conference in Detroit (both Maggie Baumann and Roger Jones contributed papers), Polyolefins 2004 (Houston) and The National Design Show (part of National Manufacturing Week in Chicago, IL). In this month and next month's newsletter we will present some highlights from these industry events.

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Donald Loopp of *Plastic News* wrote an interesting editorial in the February 23<sup>rd</sup> issue regarding the GPEC 2004 conference. GPEC this year included papers on recycling, biodegradable plastics and biorenewable materials. There also were a number of presentations regarding end-markets, e.g. automotive, electronics, packaging and construction markets. He commented that being an

environmentalist and being part of the plastics industry aren't incongruous at all. He commented that the GPEC conference (sponsored by SPE) is the most overtly environmental plastics industry event. I for one was glad to read this comment since I have long felt that plastics and the environment is an issue that we as an industry must take a leadership role. The companies in our industry must promote their own environmental efforts more- if we are practicing stewardship we need to do it more and promote it!

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Polymerplace is launching a new newsletter that will track developments in industrial biotechnology. Over the last couple of years we have covered plastics technology developments including developments in bioplastics. Based on the progress in industrial biotechnology in recent years we believe it is timely to focus on biotech and its impact on the plastics industry. Developments in nanotechnology and other related advanced technologies will also be included as appropriate.

Larry Drumm, consultant to MBI International and Metabolic Explorer (France) and Maggie Baumann of G.H. Associates are the editors and they will include contributions from experts in the industry in each issue.

### **Why Biotech?**

Experts (including McKinsey and Company) predict that the Biotech-based polymer industry will be >\$50 billion annually by 2010. This rapid expansion expected anticipated in the next 5-7 years is due to the following reasons:

1. **Biotech processes are lower cost.**

DuPont's bioprocess for making 1,3 propanediol requires 40% less capital and has a 25% lower operating cost than the chemical process for making the same product.

2. **Biotech based polymers have new functionality**

Cargill Dow's polylactic acid process produces several different polymers depending on the ratio of d to l-lactic acid used as the starting monomer. All d-polymer is significantly different from all l-polymer and the mixtures are again different. Even the blending of d- with l- polymer produces surprising results.

3. **Large players are participating in industrial biotechnology**

BASF, Dow, DuPont, Cargill, Cargill Dow, DSM and Proctor & Gamble among others are exploring intermediates and polymers

4. **Innovative companies are developing technology at a rapid rate**

Dupont believes that if they started the 1,3 propanediol development today it would take half the time and half the money.

**5. Smaller biotech companies are positioning themselves to take advantage of the boom in biotech**

Examples are: Metabolix (US), Metabolic Explorer (France), MBI International(US), Genencor, Codexis

**6. Natural fibers and processed biomass will provide new reinforcements for compounding of polymers**

The subscription rate is \$49.95 annually for 6 issues. (Bi-monthly)

The focus of the articles will be targeted to polymer R&D, applied R&D, the processing community including equipment suppliers and end-users of plastics materials and technology. For more information go to:

<http://www.polymerplace.com> and click on "New Bio-Tech Newsletter"

**POLYMER MARKETS**

**Automotive-** More on the North American Auto Show...

A number of the newer cars introduced at the show included technologies that favor the usage of more plastics from a weight reduction, safety and environmental benefit.

The Scion™, a new subcompact introduced by Toyota makes extensive use of light-weight sound absorption materials made of 100% recyclable thermoplastic throughout the cabin contributing to reduction in NVH.

Hybrid vehicles (Toyota Prius, Lexus and Highlander, Honda Civic, Chevrolet Silverado and Dodge Ram pickup) all are now mainstream vehicles.

J.D. Power reports that Hybrid Electric vehicles are expected to grow to 100,000 units in 2004 up from 40,000 sold in 2003. Hybrid sales are expected to climb to nearly 350,000 units by 2008 and 415,000 units by 2013.

Safety improvements also signal the use of more plastic systems in vehicles.

New technology in front seat sensors which determine if there is a person in the seat as well as the person's weight in order to instruct the airbag to inflate and the correct inflation power are now in mainstream vehicles. New in 2004, the optional mounted front seat mounted side airbags now include first and second row curtain side airbags. A new standard tire pressure warning system can help to reduce the possibility of loss of handling and stability or excessive tire wear due to a serious loss of tire pressure.

Many new vehicles include in mold decorating applications, e.g. a contemporary burlled maple wood grain for dash trim and door scuff plates.

J.D Power also reported that luxury vehicle sales are projected to increase 19% between 2002 and 2007. By 2007 luxury SUVs will account for 38% of luxury vehicles. However car based SUVs will account for more than 40% of all SUV sales. Many of these vehicles will include more luxurious interiors which are

enhanced by emerging plastic technologies like mono-material constructions, two shot molding and in mold decorating.

Fuel Cell Technology was also demonstrated in the Fine N Concept car from Toyota and the Honda FCX planned to be commercialized in 2004. In the Fine N the fuel cell stack, power control unit and lithium ion battery are placed beneath the floor for a lowered center of gravity and minimized YAW moment of inertia. As a result the spacious interior cabin can accommodate 4 passengers. The Honda fuel cell stack is the world's first fuel cell stack to feature a stamped metal separator structure combined with newly developed electrolyte polymeric membranes to improve efficiency, recycleability and operation over a greater range of temperatures. Honda is planning to introduce the Honda FCX next year as the first and only fuel cell vehicle certified by the EPA and California Air Resources board for regular commercial use.

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## **Packaging**

The range of commercial packaging applications for Pactiv Corporation's Hefty<sup>®</sup> Slide-Rite<sup>®</sup> Advanced Closure System has been extended to encompass first-time zipper closures for commercial sliced meat and animal crackers.

The meat is packaged in a transparent, hooded bag, while the crackers are in a foil-lined bag having a metal tamperproof seal. Closure length ranges from 5.25 inches (13.3 cm) in the cracker package to 10 inches (25.4 cm) in the one for sliced meat.

The tracks in the zippers are made of linear low-density polyethylene blends containing up to 10 percent Topas<sup>®</sup> cyclic olefin copolymer (COC) from Ticona, a business of Celanese AG (NYSE: CZ; FSE: CZZ). Topas<sup>®</sup> COC adds stiffness and strength to the film. Pactiv has seen double-digit growth for its Slide-Rite<sup>®</sup> closures in consumer packaging based on many factors. Customers like the closures because they are easy to open and close and provide a secure, consistent seal. Manufacturers like them because they help boost brand market share by projecting a high-quality image and adding value through consumer convenience and reclosability.

Pactiv designs and sells Slide-Rite<sup>®</sup> closures and licenses their use and the equipment needed to add it to bags. Slide-Rite<sup>®</sup> technology can be integrated into new or existing horizontal form-fill-seal machinery for automated operations, as well as into fabrication equipment for pre-made pouches and bags.

Pactiv developed the first mass-scale process to produce slider systems in 1995. It introduced the first application of its Hefty<sup>®</sup> Slide-Rite<sup>®</sup> slider on a retail package in 1998 and the first stand-up retail package in 1999. Since then, it has commercialized many consumer packages based on this technology, including those for fruit and vegetables, freezer products, potting soil and cheese.

Topas<sup>®</sup> COCs are amorphous engineering thermoplastics that, in addition to strength, stiffness and dimensional stability, have high clarity, transparency and

low moisture absorption. They are approved for food-contact applications in Europe and the U.S. They are also used in pharmaceutical packaging (blisters, syringes and vials), medical and diagnostics devices, precision optics, and printer toner binder resins, among other applications.

In packaging, Topas® COCs are most often used in polyethylene and multilayer films. When blended with polyethylene, they improve stiffness, maintain or lower haze, Pactiv Extends Zipper Closures Containing Topas® COC, page 4 of 5 and increase hot-tack and ultimate seal strength. As the core layer in laminated or coextruded multilayer films, they provide high moisture barrier and clarity.

For information on Topas® cyclic olefin copolymer and its uses in packaging and other areas, contact: USA. Phone: 1-800-833-4882 or 1-908-522-7500. Email: [prodinfo@ticona.com](mailto:prodinfo@ticona.com) . In Europe: Ticona GmbH, Professor-Staudinger-Straße, D-65451 Kelsterbach, Germany. Phone: +49-(0)180-584-2662 (DE) or +49-(0)693-051-6299 (EU). Email: [infoservice@ticona.de](mailto:infoservice@ticona.de) . Or visit: <http://www.ticona.com> .

For information on Pactiv's Slide-Rite® Advanced Closure System, contact: Larry Rebodos, Pactiv Corporation, 1900 West Field Court, Lake Forest, Illinois, 60045, USA. E-mail: [lrebodos@pactiv.com](mailto:lrebodos@pactiv.com) . Phone: 1-847-482-2288. Or visit: <http://www.pactiv.com> .

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## **MATERIAL DEVELOPMENTS**

At The Polyolefins conference held February 23-25, 2004, Dow Chemical introduced a new line of materials called Versify™ plastomers and elastomers. This line of materials was made possible by a new family of catalysts which are not metallocene or Ziegler Natta. They claim they have developed unique propylene ethylene copolymers which exhibit a higher melting point, higher crystallinity, a broad melting range, higher gloss, and optics. These improved properties are potentially valuable in TPE/TPO compounds, Films, rigid Packaging, adhesives, Consumer durables including spun bond non wovens and carpeting. One of the specific advantages to TPE compounds is the ability to achieve a soft touch feel but with a dry (non-oily) surface.

For more information go to <http://www.dow.com/versify/index.htm>

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## **PROCESS DEVELOPMENTS**

"Pushtrusion" is the trademark of a new, patented technology that will revolutionize the production of long glass reinforced parts via direct molding. Compounded long glass pellets were the first glass-reinforced thermoplastic compounds, made by Rex Bradt at Fiberfil in 1952. However, short glass compounds of that period proved far easier to mold and the early long glass materials became of only limited commercial interest. In the 1980s, Ron Hawley at Polymer Composites developed a new type of long glass compounds, similar to ones developed by ICI engineers around the same time. Other versions also came into being and in the late 1990s had carved out a specialty niche in the thermoplastic compound market (by this time, Polymer Composites had been

acquired by Ticona and ICI's products were being made by its former subsidiary, LNP Engineering Plastics).

Hawley left Polymer Composites after it was acquired and set up a molding company, Woodshed Industries, to make long glass parts via an integrated direct molding process that eliminated the compounding step to make pellets. His work resulted in a series of patents, which are now being licensed by newly-formed PlastiComp, Inc. (disclosure – the author of this article is a board director of and small investor in this company). The process takes continuous glass fiber, meters-chops-mixes- it with molten polymer and feeds it into the barrel of an injection molding machine, which produces parts. The process can be varied to make a wide range of glass content and fiber length. It competes with parts that are compression molded from long glass fiber sheet, such as Azdel, and also processes that are discontinuous, producing performs that are then compression molded. The continuous nature of the Pushtrusion process and the elimination of a processing step, be it compounding or sheet production, offers significant savings in material costs. Pushtrusion equipment can be retrofitted to almost any existing injection molding machine, a further important saving, compared to buying all new equipment.

Direct molding via the compression route has become an important and growing sector in the European automotive parts industry but has yet to make major inroads in NAFTA and Asia. Given the enormous pressures to reduce costs of automotive components, it is clear that there will be significant growth in the use of these technologies globally.

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## **BUSINESS MODELS**

At the recent *Plastics News* Executive Forum February 1-3, 2004 a lot of the presentations observed that we are in the midst of a structural change in the plastics industry. Many of the presentations incorporated a theme of emphasizing core competencies and looking for ways to enhance those competencies either through acquisition or partnerships.

Strong research efforts and partnering with other companies are important initiatives for plastics companies today. The message at the *Plastics News* conference echos comments that were made by Thomas Waltermire, chief executive officer of PolyOne Corp. of Avon Lake, Ohio. Waltermire spoke last year at TPE Topcon 2003 conference in Akron.

“Moving technology constantly upstream is the only future for our industry,” said Waltermire, whose firm is North America’s largest compounder. “We have to have it clearly in our minds that we can no longer win business on the strength of our backs and arms — we have to do it with our minds.”

Waltermire cited recent material-development partnerships PolyOne struck with Bayer Corp. of Pittsburgh and Noveon Inc. of Brecksville, Ohio, as examples of needed collaborations.

PolyOne itself was created in 2000 by merging major compounders Geon and M.A. Hanna Co. In spite of PolyOne's recent challenges — the firm has lost \$130 million in the last two and a half years — Waltermire feels the merger was still the right thing to do.

“Our businesses are stronger together than they would have been separately, because of our economies of scale and global replication of core products,” he said.

Waltermire then mentioned one of PolyOne's recent successes — the use of its red- and green-colored compounds in high density polyethylene cans for Procter & Gamble Co.'s Folgers coffee.

“Customers like Procter & Gamble recognize our ability to reach many markets,” Waltermire said.

**References:** The stories in *PolymerPlace Notes* come from a variety of sources including Company Press Releases, Interviews, and trade publications, e.g. *Plastics News* and newswires.

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<http://www.Polymerplace.com>

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