

PolymerPlace Notes

A plastics technology newsletter

By Margaret Baumann, G.H. Associates

Volume 8

November 2007

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Inside PolymerPlace

We have been busy in the last couple of months attending and speaking at conferences.

We attended the first **Sabic Innovative Plastics Seminar** (formerly GE Plastics) in Stamford CT in September. The seminar was the first since the ownership officially changed to Sabic. The staff put together an informative day of sessions- you were able to choose from a variety of seminars including design, processing, markets and semi-finished goods like sheet and film. Although Sabic engineered materials were discussed the seminars were also full of general information. The GE product teams were available in a trade booth format to discuss specific product families and customer needs.

On September 13-14, we attended the **Plastics News Survival Boot Camp** held in Chicago. If you were not able to attend, we recommend you consider attending when offered again through *Plastics News*. There was a mix of benchmarking, lean manufacturing and new plastics

technology discussions. Some of the speakers included Brian Jones (formerly with Nypro, Now Coral Equity Partners.), Jack Avery (formerly with GE Plastics), Tom Murdough (former President of Little Tikes and then Step 2, Jeff Mengel of Plante Moran , Tom Duffey of Plastics Components Inc and Jack Gravelle of Mar Lee Companies. These presentations were intended as “techniques” and strategies for thriving in a competitive environment. In addition there were numerous case studies of companies (custom processors) who had “turned their companies around” in the last couple of years. The speakers were open and thought-provoking. These presentations were followed by panel discussions with time for questions and dialog with attendees. The attendees were typically middle and upper management of custom processors. We felt that the conference was well worth the time and money.

On September 17-18 we attended the **SPE TPE Topcon**. The conference was very upbeat and well-attended. TPEs continue to grow in usage and the conference had numerous papers with excellent technical content demonstrating that the range of TPE performance continues to grow. Robert Eller Associates discussed new technology in Europe and North America; Roger Young of Robert Eller Associates discussed the growth of Specialty TPEs in China largely due to a shift of end use industries to China causing the supply chain to adapt in relation to the change in demand. Dow gave a paper on their Infuse Olefin Block copolymer, Dupont of ETPV (higher performance) TPEs, Kaneka Texas introduced an Isobutylene based TPV and next generation TPUs (softer) were introduced by BASF.

Maggie Baumann of G.H.Associates spoke at the **AMI Foam Conference** held October 2 and 3rd in Newark, New Jersey. The conference was very well organized covering the gamut of plastic foam materials, technologies and applications. GHA presented a paper on the *Commercialization of New Technology- Pitfalls and Best Practices*. Trexel (the Mucell Process) had opened the session with a history of their commercial development process. Trexel announced that they had formed partnerships with nearly all the equipment companies allowing Mucell to be available on nearly any new injection molding machine. In addition there were presentation on screw designs to optimize the foaming of polyolefins, and the foaming of biobased materials. A particularly good presentation was the one co-authored by Natureworks and Plastic Engineering Associates Licensing regarding a technology they have developed to foam Polylactic Acid Polymer (PLA) – this would allow PLA to participate in an even broader sector of the packaging industry., e.g. foam trays, etc. We understand that Sealed Air is working with PLA..

The M&M division of the SPE and the Pittsburgh section of the SPE held a one-day marketing seminar on October 4, 2007. GHA presented *Market Research in the 21st Century*. Roger Jones also presented a paper on *Competing Regionally in a Global Market*. The GHA presentation and Roger Jones presentation are available through the following link. <http://www.polymerplace.com/studies.htm>

The K Show Is King – Again!

By Roger Jones

The K 2007 show in Düsseldorf, Germany, just finished its latest triennial run on November 1. Once again, it established itself as the premier show for the global plastics industry. It is the biggest and most comprehensive show anywhere in the world, and – most importantly to this writer – the only plastics show left where one can find virtually all of the polymer manufacturers showing their new products and applications. Polymer producers some time ago have almost entirely bailed out of NPE and the European regional shows and have never had a real presence in the Japanese and Chinese shows; they are usually represented by distributors who are more focused on meeting existing customers than showing off their product lines.

The most interesting thing in this K show to this visitor was the substantial increase in exhibitors from India and Turkey, who have never been so visible before. The Indian presence was lead by Reliance Industries with a huge booth, comparable to many of its competitors, such as Borealis or even SABIC. The Turkish company booths were far more modest, but, like the Indians, their presence is going to be increasingly more noticeable in the future as Turkey becomes the

dominant economic nation in the Middle East. By effectively denying Turkey full membership, the EC has forced the Turks to find look elsewhere for the future. Turkey has an enterprising and vigorous business climate, with a growing population, and should not be overlooked as an attractive location for business investment in the future.

(Disclosure – I am board chairman of PlastiComp LLC, an LFTP technology and product company). My visit to the machinery halls was focused on just two companies which have had a comparative success in LFTP equipment during the past five to six years. However, I was disappointed in what I saw at the booths of Dieffenbacher and Krauss-Maffei. Dieffenbacher's exhibit certainly featured its D-LFTP transfer molding equipment, but really nothing that they have not exhibited in previous years; there were a few new applications, but that was it. Krauss-Maffei exhibited a huge D-LFTP injection molder at the last two K shows, but had no such equipment on display this time, suggesting that they may believe the market for such multi-million dollar machines has peaked. K-M did show a large "compounding molding machine" but this appears to be a very specialized piece of equipment for a rather limited market, such as making your own impact-modified thermoplastics blends in-line with molding. One would think that very few processors would find this of sufficient value to justify a six-figure investment in equipment, let alone formulation technology.

While the materials suppliers were showing some new products, the emphasis tended to favor new applications and how the suppliers' materials could broaden design opportunities. LFTP applications and new products were certainly evident: Ems Chemie announced its new line of long fiber reinforced high-temperature nylons; DuPont showed its Zytel LF-HTN in a demanding sporting goods application; SABIC had one corner of its booth devoted to its newly acquired GE Plastics line, but mainly featured its previously existing STAMAX LFT-PP concentrate used in a variety of large automotive parts (none of its LNP Verton line products were shown); Ticona included a number of Celstran LFTP parts in its large and diversified exhibit.

The company with the most genuinely new polymer products to offer was India's Gharda Chemicals. While Gharda did spin off its PEEK and PES business to BP/Solvay Advanced Polymers a few years ago, they are most certainly not out of the advanced polymers business. Their exhibit included several advanced monomers/co-monomers and three novel polymers: polyetherketone (PEK), polyethernitrile (PNI), and a series of fluoropolyimides (FPI), all featuring high environmental and heat resistance.

Eastman Chemical also introduced a "truly" new copolyester material, Tritan™. It is positioned to compete in the gap between PETG and Polycarbonate. We'll be covering this more in the next newsletter.

Polymer Developments

Having recently returned from the K show there were numerous new product introductions. Several of these were bio-based or bio content materials but there were also new materials introduced as well as polymer additives that help broaden product lines. In the next two newsletters we will be covering these developments.

New Renewable Polymers/Polymer Products from DuPont

DuPont continues its progress in the development and launch of high-performance polymers made with renewable resources. According to Dr. Nandan Rao, global technology leader for DuPont Performance Materials, research programs to develop materials based on renewable resources are paying off with new offerings that provide comparable or better performance than the petrochemical-based materials they replace for automotive, electrical, packaging and other markets.

One of the new offerings is engineering polymers based on Sorona™. A key ingredient in Sorona® EP is Bio-PDO™ which is made at the recently inaugurated DuPont Tate & Lyle Bio

Products facility in Loudon, Tenn. Bio-PDO™ replaces petrochemical based 1,3 propanediol (PDO) and/or 1,4-butanediol (BDO) in the two glass-reinforced grades of Sorona® EP that will initially be available. Sorona® EP offers performance advantages compared to polybutylene terephthalate (PBT), including improved dimensional stability and surface appearance. Sampling for targeted development programs is under way with broader availability expected in 2008. These products are an addition to the portfolio which also includes Hytrel® RS. Hytrel™RS incorporates DuPont™ Cerenol™ renewably sourced polyol made with Bio-PDO™, as a replacement for petrochemical polyols. Initial grades of Hytrel® RS will have a renewable content range of 25-50 percent. Hytrel® RS will offer comparable performance to standard grades of Hytrel®. Sampling for targeted development programs is underway with broader availability expected in 2008.

Biomax® RS 1001 is a renewably sourced polytrimethyl terephthalate (PTT) offering aimed at rigid packaging applications such as injection molded containers, caps and consumer items such as media cases where it would replace polypropylene. Initial applications are targeted for cosmetics, food and consumer goods packaging. Biomax® RS 1001 incorporates has a renewable content of 35 percent with Bio-PDO™ as the key ingredient.

Selar® VP is a renewably sourced breathable film, designed for use in applications where foods need to respire, such as fresh fish and produce. It is up to 40 percent renewably sourced with the incorporation of a vegetable based fatty acid. In seafood applications, it provides a tightly sealed package for fresh fish versus open, unsealed polyethylene bags that are commonly used today. In produce applications, it provides a completely sealed packaging alternative to microperforated films.

DuPont has made a big commitment to sustainability. The new offerings will hopefully contribute to the company's goals of doubling revenues from non-depletable resources to at least \$8 billion by 2015.

Milliken rebrands MFT as Tegriss™

Milliken & Company, widely acknowledged as a world leader in textile innovations, has rebranded MFT, its 100% polypropylene (PP) thermoplastic composite, as Tegriss™.

The new name is intended to reflect the material's outstanding performance competitive in many applications with Kevlar™, Spectra™ and Dynema™.

Tegriss delivers a unique combination of product properties and opportunities for weight and/or cost reduction in a range of markets, including armor, transportation and recreational applications. It has the ability to offer lower weight of 30-60% alongside superior impact resistance and stiffness even at low temperatures.

Several commercial applications have been realized since the material was introduced in 2005. These include ballistic spall liners for secondary fragment catching and good multi hit performance, ballistic ceramic supports, and carbon fiber replacements in high- end motor sport components and water sport consumer applications such as helmets, kayaks and canoes.

"We wanted a powerful new name that would resonate with our customers and work on a global basis," Todd Kleman, marketing strategist, said. "We think Tegriss represents an elegant approach to impact resistance and stiffness, with opportunities for weight reduction vs. glass filled materials and attractive economics in high performance fiber hybrids.

Milliken introduced a 4th generation clarifier for Polypropylene and a new nucleator for Polyolefins including Polyethylene.

Introduced at the K show, Millad NX8000 offers a step change in haze reduction compared to existing clarifiers. Its typical 50% reduction in haze versus the current industry standard makes highly-transparent polypropylene an achievable reality for converters and end-product specifiers. Polypropylene clarified with Millad NX8000 can be used in applications such as food contact without imparting taste or odour onto the product. This enhances the already attractive package of unique benefits offered by polypropylene which includes low cost and density, stiffness/impact balance, and thermal and chemical resistance. Polypropylene clarified with Millad NX8000 can be processed using all available technologies. This allows converters and product designers to create attractive parts or packaging regardless of the part design or process used.

In addition, Milliken Chemical is continuing to expand the performance horizons of polyolefins with its pioneering nucleation technology. Hyperform[®] HPN-20E makes cost-effective property modification of polyethylene (PE) a first-time reality for converters, resin and master batch producers, while providing a versatile, one-stop optimizing solution for polypropylene (PP). Hyperform HPN-20E is a hyper-nucleating agent with food contact approval. When added to polyethylene or polypropylene it affects the crystallization behaviour resulting in a wide range of property enhancements. These can include barrier improvements, optimum stiffness/impact balance, high quality aesthetics, potential weight and material reduction, and processing benefits such as faster cycle times owing to warpage elimination and shrinkage optimisation. Initially launched for the blown film polyethylene market, Hyperform HPN-20E is the first ever commercially available nucleating agent for polyethylene. Its benefits however make the agent suitable for a wide range of both polyethylene and polypropylene end products including automotive, appliance, closure, material handling and sheet/thermoforming applications. It can be processed using blow molding, rotomolding, injection molding, compression molding and extrusion.

Martin Horrocks, global market manager, Polyethylene Additives for Milliken Chemical comments: "This unique nucleation technology is able to influence the crystallization behaviour of polyethylene in previously unseen ways. Hyper - Nucleation provides the polyethylene industry and its end-users with another tool to achieving and controlling specific sets of properties depending on the end application needs.

For more information about Milliken, please visit www.millikenchemical.com
For more information on Tegriss, visit www.tegris.milliken.com

Process Developments

Randcastle extrusion has introduced an additional new screw design called the Elongator.

Since 2000, Randcastle Extrusion Systems, Inc. has pioneered an innovative extrusion screw technology – a recirculating elongational mixer called the "Recirculator". This screw design achieved unrivaled single screw results and competed favorably with twin screw technology especially in nano-scale compounding and specialty applications. The Recirculator retained the traditional single screw advantages over twins—high stable pressures and low cost. Earlier this year Randcastle created a new generation compounding screw using some of the same principles called the Elongator. It retains the key compounding principle—multiple elongational flow fields—and increases the forwarding for higher output. This has the additional advantages of high output venting and decreased residence time. The Elongator keeps the twin competitive compounding technology and then adds multiple thin film venting technology. The forwarding decreases the residence time and this is beneficial for thermally sensitive materials. Visit PolymerPlace <http://www.polymerplace.com/studies.htm> for a presentation on the benefits of these innovative screw designs from Randcastle. For more information contact Keith Luker at Randcastle Extrusion, phone: (973)239-1150 or sales@randcastle.com

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NEW INFIN™ COATING TECHNOLOGY THAT APPLIES LONG LASTING COATINGS TO WOOD PLASTIC COMPOSITES

INFIN™ Coating Technology, a new process to coat wood plastic composites in virtually any color while enabling them to resist fading, heat retention, mold, mildew, stains and abrasion was introduced at the 2007 Wood-Plastics and Natural Fiber Composites Show in Baltimore October 8 and 9. INFIN Coating Technology was jointly developed by Inhance / Fluoro-Seal Ltd. and Finishes Unlimited.

Additional information is available at (www.paintablecomposites.com). WPC decks, railing, window and door profiles and trim can even be repainted by home or property owners years later.

The new technology provides these characteristics to the composite by changing the molecular structure of the surface and then coating it with a patent pending UV curable coating. During the process, the extruded composite is first fed through a second chamber where it is exposed to a reactive gas atmosphere that oxidizes the surface so it will accept the coating. It is then immediately fed through an inline vacuum coating chamber where the coating is applied and instantly cured by UV lamps. The composite can be handled immediately after the coating step.

Finished Unlimited developed the UV curable coating specifically for this application and has applied for a patent. The system to expose the composite to the reactive gas was developed by Inhance / Fluoro-Seal.

The INFIN Coating Technology process system, can coat composites at speeds of up to 200 fpm, and can be installed as the final step of a composite production line or a manufacturer can produce boards and profiles to be coated at a later time or even at another location.

Ken Burton, president of Finishes Unlimited, and Kelly Williams, business development manager of Inhance / Fluoro-Seal emphasized that the new technology is an extremely environmentally friendly procedure and requires very little floor space. They explained that the first phase of the process utilizes very small amounts of reactive gas at any given time and is conducted at less than atmospheric pressure, eliminating chemical emissions. All process gases are completely neutralized. The coating is a 100 percent solids coating containing no water or solvents. As a result it contains no VOCs or HAPs to be emitted into the manufacturing environment and contains no flammable elements.

This product has undergone extensive laboratory, accelerated weather and field testing to assure that it meets the appearance and performance standards we are promising.”

For more information call Kelly Williams at 513- 683-4667 or Ken Burton at 630-466-4881 x 23.

About Finishes Unlimited.... Founded in 1970 and headquartered in Sugar Grove, IL, Finishes Unlimited www.finishesunlimited.com is a leading producer of industrial coatings including 100 % solids UV cured coatings as well as baked enamel and air dry water borne coatings.

About Inhance / Fluoro-Seal ... Inhance/Fluoro-Seal, Ltd, www.inhance.us, headquartered in Houston is a sister company of Fluoro-Seal International (www.fluoroseal.com), which has been in business since 1983. Both companies are highly active in the field of reactive gas modification of polymeric surfaces.

Developments in Training and Design

RJG/Routsis online training programs are well known and recognized in the plastics industry. They are available in English and other languages including Spanish and Mandarin. They also have a version for the European marketplace in which they have changed the terminology to those that are used in Europe.

RJG/Routsis offer products that no one else offers such as mold design and mold making plastic part design, injection molding machine maintenance, and processing at all levels.

They are introducing a program in which a dedicated training portal for any company. With this portal you will be able to control the amount of usage and record the specific activity in which your customers participate. Full tracking is available.

You have the ability to enroll customers of your choice. We would also be able to set up a dedicated portal for you to offer to a specific customer.

RJG/Routsis will make accessible all of our courses which consist of an extensive library of training products. An online form at will enable continual addition of new products as well as updating existing ones.

Call A. Routsis Associates for a demonstration of an actual online module for your review. Call 978-957-0700 or sales@traininteractive.com

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

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November 2007