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# PolymerPlace Notes

*A plastics technology newsletter*
By Margaret Baumann, G.H. Associates

**Volume 8** **January 2007** **800.207.7659**

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## Inside PolymerPlace

Happy 2007! 2007 has gotten off to a crazy start. Just as we were getting used to the idea of GE selling their silicones business (a household name), GE announces the intended sale of the GE Plastics businesses (other household names). The intended sale of the Plastics business was first reported in the Wall Street Journal on January 8th, 2007. We all have an opinion about this…Roger Jones has written an article discussing the GE Plastics planned sale and it follows this article. Although lower demand has kept energy costs more stable than expected, it is clear that the days of cheap energy and feedstocks are now gone. This has probably not only influenced GE's decision but it is improving the economics for alternative technologies, e.g. bio-based polymers and raw materials.

Starting this month and ongoing we will include an article or two each month on emerging technology in plastics specifically biotechnology and nanotechnology. As we have mentioned in recent newsletters the business environment in plastics is paying more attention to these technologies.

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## The End of an Era (or GE Runs Up the White Flag)
## by Roger F. Jones

We really have reached the end of an era when GE says, “no mas” and put its plastics business up for sale to the highest bidder. And this only a few months after it sold off its specialty silicone business, presumably the more profitable sector, to a private buyer. This raises the question, “is this a GE problem or an industry problem”? In my opinion, it is both.

Note that GE’s plastics operations are still dominant in their primary market niches, e.g.., Lexan and Noryl, Valox, Ultem, etc.; so far, so good. But – and it’s a big “but” – its plastics business has shown that it is no longer able to generate sustained revenue growth in all but the low points in economic cycles. Worse, it has been unable to exert sufficient pricing power as to be able to stay ahead of raw material cost increases. Recurring reduced profitability is simply unacceptable to GE corporate leadership in any of its business units.

How did GE get to this point? There are a number of reasons that come to mind:

First, GE is not backward integrated in feedstocks for its polymers but this has become an essential element for any large-volume polymer producer in today’s globalized marketplace. Without backward integration, feedstock costs are no longer controllable or even manageable.

Second, GE has been unable to develop a sufficient number of significant new products to keep earnings growing steadily. Worse, when it has acquired companies that knew how to do this and do it superbly, e.g., Borg-Warner and LNP Engineering Plastics, it *deliberately extinguished* the business cultures in these acquisitions, rather than learn, adopt, and incorporate them. This is a monumental management failure, one of hubris (“we know better than these yokels how to run a specialty business”); unfortunately, this is all too common a failing in a number of large companies, not just GE.

Fundamentally, GE Plastics has become commoditized without GE management’s willingness to admit it openly and then take appropriate action while retaining ownership. The GE corporate answer turns out to be: throw in the towel and sell off the business. I suspect that GE corporate leadership does know what it would have to do to fix this problem but this same management lacks the attention span and patience to do it. One knowledgeable industry figure with whom I have spoken to recently about this topic says that GE Plastics must undergo a major culture change in order to adapt and succeed; he thought the only way that could take place is through sweeping personnel changes (which will likely come about when it is acquired). To put it bluntly, a culture change is also needed at GE’s corporate level, too, which is stuck in the old Jack Welsh mode of de-industrializing its business.

Moving on to the broader picture, the commoditization of many polymers has become an industry problem as well. The volatility of oil and natural gas prices during the past few years has resulted in particularly severe cost pressures on the industry. Together with the tunnel vision “China Price” mentality of many plastics products buyers and the serious business problems at GM, Ford, and Daimler-Chrysler, all of the sectors of the plastics industry, from polymer producer to molder, have been under exceptionally heavy stress for the past five years. The result has been a number of business failures and consolidations.

Nevertheless, I think the worst could be behind us now, barring a major war in the Middle East or a series of very cold winters in the northern hemisphere. The supply of crude oil and gas has

been growing significantly (by this I mean both in storage and accessible reserves in the ground) and prices have been moving down, reflecting this growing excess of supply over demand. The dislocations of globalization also may start moderating, since China and India are now seeing their domestic markets take off, putting less pressure on companies in these countries to export. And, as I have urging in my papers and books for the last several years, many of the larger plastics industry firms and/or their divisions (such as GE Plastics) are being privatized, either by voluntarily delisting from the stock exchanges or through acquisition by private buyers. Private ownership does not have the need to show regular quarterly earnings increases and thus can manage for long term results. Private ownership also means automatic savings of a minimum of $3 M in accounting and legal fees to comply with the punitive Sarbanes-Oxley law (that applies only to publicly held companies) and removes the threat of criminal prosecution of executives for accounting errors that prosecutors can allege under highly subjective terms.

Despite the commoditization of much of the plastics industry, it has not yet reached maturity, defined as the inability to grow faster than the GDP. There are still many great opportunities ahead. Let's try to enjoy the ride.

## Polymer Markets

## Packaging

**As we enter 2007, it is clear that three factors are influencing plastics packaging-the price of resin, the globalization of the customers using plastics in packaging and the emergence of green products.** Retailers like Whole Foods and Wal-Mart are beginning to drive the "Green products". Wal-Mart has actually introduced the concept of the packaging score card and will begin grading suppliers in 2008 on environmental standards as well as innovation, energy efficiency and material use. One packaging expert predicts the effort may not go smoothly.

Robb Zurek, business development manager with Continental Packaging Solutions Inc. in Chicago is moving into polylactide for packaging products like cosmetics compacts.

PLA can be run in molds designed for PET containers and has worked successfully in tools designed for polypropylene, according to Continental. PLA also is good for short-shelf-life dairy products, juice and water bottles and for trays for deli meats, salads and single-serve meals.

Sustainable packaging creates an attractive growth opportunity for packagers over the medium to long term. Sustainable plastic packaging has been growing at a 5-plus percent clip between 2001 and 2005, with the forecast for a modest acceleration through 2010. The volatility of conventional plastic raw materials will improve the rate of penetration of bio-based materials into packaging applications.

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## Electrical/Electronic

**Ticona, the engineering polymers business of Celanese Corporation, has introduced a new grade of Vectra® liquid crystal polymer (LCP)** that extends the operating temperature and flowability of its LCP resins for use in demanding connector and lead-free, surface-mount applications. The new grade, Vectra® LCP S135, has a distortion temperature under load (DTUL) of 335°C (635°F), improved weld-line strength, and a reduced viscosity that allows it to fill walls as thin as 0.2 mm (0.008 in).

Vectra LCP S135 is targeted at surface-mount applications, especially those that must meet RoHS lead-free solder directives, for DIMM, DDR and fine-pitch connectors. Its unique polymer structure allows S135 to achieve a high DTUL, yet process stably at temperatures significantly lower than other high-DTUL LCPs. Vectra S 135 can also be molded at tool temperatures below 93°C (200°F), which allows for molds cooled by water rather than oil and for rapid cycle times.

Vectra S series compounds also have extremely low outgassing levels, which minimizes the possibility of blinding lenses in optoelectronic devices and improves contact life in miniature sealed relays.

"We developed Vectra S135 to meet our customers' needs for ultra-high heat resistance, thinner walls and faster cycle time," says Edward Hallahan, Global Product Manager – Vectra LCP. "This grade is another step in our ongoing effort to push the LCP envelope. In the near future, we expect to bring two more high-temperature Vectra grades to market in North America. Both will provide for improved flatness, and one will be able to fill wall thicknesses of less than 0.2 mm at low filling pressures."

**For more information**
For information on Vectra S135 LCP, contact: Ticona, 8040 Dixie Highway Florence, KY 41042, USA. Phone: 1-800-833-4882. Email: 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. Or visit: www.ticona.com.

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**Four Chemlon® nylon compounds from Chem Polymer Corporation meet stringent flame-retardance requirements** while providing a range of other performance and regulatory-compliance options for injection molders of electrical and electronic components, the company announced today. The compounds are UL 94 listed as V-0 formulations and include both glass fiber-reinforced grades with halogen flame retardants and unreinforced, non-halogenated grades.

Chem Polymer manufactures these and other engineering thermoplastic compounds on a custom basis and offers them with a wide range of fillers, reinforcements, and modifiers. A subsidiary of Teknor Apex Company, Chem Polymer can supply identical formulations of any grade from its plants in the UK and the U.S., as well as from the Singapore facility of another Teknor Apex subsidiary, Singapore Polymer Corporation.

The four compounds cover a range of mechanical, thermal, and electrical properties required in applications such as electrical switches, housings, plugs, connectors, terminal blocks, and coil bobbins (see table). All are available in natural, black, and custom colors. The compounds are:

● ***Chemlon 133 GVH*** nylon 66-based compound with 30% glass fiber reinforcement by weight, plus a halogenated flame retardant formulation.

● ***Chemlon 182*** nylon 66-based, non-halogenated compound.

● ***Chemlon 233 GVH*** nylon 6-based compound with 33% glass fiber reinforcement by weight, plus a halogenated flame retardant formulation.

● ***Chemlon 282*** nylon 6-based, non-halogenated compound.

, Chem Polymer operates plants in the United Kingdom and the U.S.A. Its UK office is at Tat Bank Road, Oldbury, West Midlands B69 4NH, UK. Tel: 44-121-665-2105. Fax: 44-121-544-5530. Email: etpsales@chempolymer.co.uk. In the U.S.A., Chem Polymer has offices at 2443 Rockfill Road, Ft. Myers, FL 33911 USA. Tel: 1-239-337-0400. Fax: 1-239-337-4461. Email: chemlon@chempolymer.com. Visit the web site: www.chempolymer.com.

## Polymer Developments

### European and American TPE Suppliers Following Markets to China- Battling Local Compounders

China's lower labor costs and the potential for serving a large Chinese domestic and export market have attracted Western manufacturers of a broad range of markets that use TPEs. Non-Chinese TPE compounders have begun to establish operations either on the Chinese mainland or nearby to accommodate these rapid growth markets. In doing so, they encounter a new

competitive interface with the local Chinese TPE compounder community which is well connected with domestic customers and capable of competing effectively.

The result is a series of nationality-based, parallel TPE supply chains that for the moment rarely converge. As TPE technology proliferates to the domestic Chinese compounders and the transplant compounders broaden their grade slate to accommodate local tastes, quality, pricing and performance levels, the supply chains will converge to form an intensely competitive arena for TPE compounds.

These conclusions are part of a multiclient analysis recently completed by **Robert Eller Associates, Inc**. titled "Specialty Thermoplastic Elastomers…Markets, Economics, Intermaterials Competition, and Industry Structure in China". The REA study analyzes the intermaterials competition between olefinic TPVs, styrenic block copolymer TPEs, TPUs, COPE and TPOs through 2010.

REA's China study includes analysis of the TPE industry structure including raw materials, compounders, agents/distributors, macro-economic factors affecting the China TPE market, market sector profiles of all the market sectors in which TPEs participate (including a major chapter on automotive- the largest market sector for TPEs), intermaterials competition, and profiles of industry participants. The competitiveness of the evolving India market and its contrast to the China market are also included.

The study evaluates the impact of the China TPE market size, growth rate and the end user demand shift from Asian and Western countries and the demand effect of the growth of domestic Chinese manufacturing. On the supply side, the study analyzes the competition between domestic Chinese TPE compounders and transplant compounders, the Chinese cost advantages, the role of the Japanese TPE producers, pricing and the convergence of the currently parallel TPE supply chains.
For more information contact Robert Eller at 330-670-9566 (email: bobeller@prodigy.net) or Roger Young at +64-21 725 745 (email: rogeryoung@robertellerassoc.com) or at the REA website: http://www.robertellerassoc.com.

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## Research and Markets has recently announced their new report on Biodegradable Polymers

This report analyzes the worldwide markets for Biodegradable Polymers in thousand pounds. The Major End-Use Segments Analyzed are Packaging (Loose-fill/Other), and Compost Bags.

The report also provides market analytics for the US market by the following product segments - Co-Polyester, PLA (Polylactic Acid), and Starch. The report provides separate comprehensive analytics for the US, Canada, Japan, Europe, Asia-Pacific, Middle East, and Latin America.

Annual forecasts are provided for each region for the period of 2006 through 2013.

The report profiles 116 companies including many key and niche players worldwide such as Absorbable Polymers Internationa, American Excelsior Company, BIOgroupUSA, Inc., Bayer AG, BASF AG, Biotec GmbH, CEREPLAST, Inc., Cortec Corporation, Dupont, Daicel Chemical Industries, Ltd, Eastman Chemicals Company, EarthShell Corporation, ECM BioFilms Inc., FP International, IRe Chemicals Limited, KTM Industries, Inc., Metabolix Inc., Mitsubishi Plastics, Inc., Mitsui Chemicals, Inc., National Starch and Chemical Company, NatureWorks LLC, Novamont S.p.A, Planet Polymer Technologies, Inc., Rodenburg Biopolymers, Showa High Polymer Co., Ltd., Storopack Hans Reichenecker GmbH, Solvay S.A, and Toyobo Co., Ltd.

Market data and analytics are derived from primary and secondary research. Company profiles are mostly extracted from URL research and reported select online sources.

For a complete index of this report click on:
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Just one month before the announcement of the possible sale of GE Plastics, **GE introduced a new Thermoplastic Polyimide polymer. Extem™ is the name of the new TPI family**. Commercial quantities are planned in February or March of 2007 from a semi-works plant. Extem is a fully amorphous polymer with similar processability but a higher heat resistance than

competitive Polyimide products, i.e. a glass transition temperature up to 311 degrees C and continuous use up to 230 degrees C.

GE claims that compared to other high end thermoplastics like PPS and PEEK, Extem has better creep resistance and dimensional stability. Extem also is transparent and inherently flame retardant (45 LOI). GE sees application in underhood auto parts, aerospace and military uses, down-hole oil and gas production, medical membranes, electrical connectors, electronics for lead free soldering, semiconductor wafer handling, and specialty films for insulators and flexible circuitry. Pricing is expected in the range of $27.00-$45.00 per pound and $18.00 in blends with Ultem™.

For more information contact: 1-800-845-0600.

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**Idemitsu Kosan, Ltd, Tokyo, Japan has begun full scale production of SPS (Syndiotactic Polystyrene) at an 11 million pound per year plant in Japan.** The material was invented by Idemitsu in 1985 but was produced jointly with Dow Chemical in 2000. Dow discontinued the product in 2004. Syndiotactic polystyrene is a clear, heat resistant, crystalline engineering thermoplastic. A broad line of Xarec™ SPS and SPS/PS blends is available today through Idemitsu chemicals USA in Southfield, Michigan. For more information contact: 248-355-9590. Dow did not believe the product would be the volume thermoplastic they were accustomed to. They thought it would be a replacement for PBT and PPS.

## Process Developments

**GLS Corporation, McHenry, Ill., recently announced that their newly opened thermoplastic elastomer (TPE) facility in Suzhou, China (July, 2006)** .The facility has already achieved ISO 9001 certification. The company believes such certification was not only achieved in record time, but may be the very first United States TPE compounder to achieve such certification with a China based facility

GLS Corp. specializes in the manufacture of application-specific custom formulated soft and ultra-soft thermoplastic elastomers (TPEs) for injection molding and extrusion. GLS has supplied specialty TPEs to the industry since 1979, and is recognized as a global leader in TPE technology solutions.

Dan Dague, president of GLS Corp. said, “This is yet another confirmation of our goal to hit the ground running with this new facility. From the day we opened the new GLS plant in China to serve both Asian and other world markets with considerably increased capacity, we have been almost completely booked. And now earning certification within just a few short months, customers can be assured of the same high quality and standards we have offered at our United States production facilities.”
This news also shortly follows announcements by GLS for receiving an environmental award and recertification to ISO 14001 at its main production facility in McHenry, Ill..

General Manager for the Suzhou operation, Ms. MC Tan said, “Our goal was to quickly earn ISO 9001 certification to meet the demands by customers, to assure them that this new facility met the same high standards of other GLS TPEs formulated elsewhere. Customers can be assured of the same high quality materials from this operation for their needs around the globe.”

GLS Corporation specializes in the manufacture of application-specific custom formulated soft and ultra-soft thermoplastic elastomers (TPEs) for injection molding and extrusion. Specific products sold by GLS include proprietary DYNAFLEX® TPE compounds based on KRATON® polymers (available in injection molding and extrusion, as well as medical and FDA grades); VERSAFLEX® TPE specialty alloys (available in soft touch, lightweight, ultra-soft, ultra-clear and

overmolding grades); VERSALLOY® TPV alloys; and VERSOLLAN™ TPU alloy compounds. GLS is also the exclusive distributor of KRATON® compounds and polymers for the compounding market in the United States, and also distributes KRATON compounds and polymers globally.
In China, for more information on the TPEs and services from GLS, contact: GLS Thermoplastic Alloys Suzhou Co. Ltd.Tel: +86 512 6265 2600. Fax: +86 512 6265 2700. E-mail: asia@glscorp.com. Web: www.glscorp.com.

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## Product Development Services

**M-Base Engineering + Software GmbH has recently added additional services to its Material development software:**

· New Version of Material Data Center
· Tradename Database
· Anisotropy Material Data for CAMPUS®
· Design Guidelines for Natural Fiber Reinforced Plastics · Presentation of Creep Data in CAMPUS

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**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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**Januaey 2007**