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PolymerPlace Notes

A plastics technology newsletter

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What's new at Polymerplace

We attended the MDM West/Plastec West/Design West, Pack West show January 31-February 2, 2006 in Anaheim. We will cover some highlights from the show in this issue.

We will be attending the Polyolefins Conference in Houston (February 26-March 1) and the GPEC 2006 Conference (February 28-March 1, 2006). These are both SPE sponsored events. Later in the month of March we will attend National Manufacturing Week in Rosemont Illinois (March 21-23, 2006). We plan to cover highlights from these events in our next newsletter.

Don't forget this is an NPE year and so far it looks like the show will meet any past records if it isn't the largest ever.

Preview of New Book on Globalization
By Roger F. Jones

The American Chemical Society's Book Publications Department now has in its possession a peer-reviewed manuscript for a book titled, ***"Globalization and the Chemical Industry."*** The preliminary publication date is May 2006, and this book will appear as one of the ACS Symposium Series (put out by Oxford University Press), inasmuch as it is based on a symposium of the same name presented at the ACS National Meeting in March 2005, San Diego, CA, and cosponsored by the Business Development and Management Division and the Committee for

Economic and Professional Affairs. The writer organized this symposium and is the editor of the book, as well as one of the authors.

The book consists of three chapters and will likely run somewhat longer than 180 pages. Do not think that the brevity makes it short on data – quite the contrary! There are 137 references, allowing readers not only to fact-check, but to look up additional information on this topic. In addition, there are 36 tables and figures. The work is distributed between three areas of strong interest: the chemical industry overall (excluding pharmaceuticals), the pharmaceutical industry, business and industry in China. The authors, naturally, approach the study from a US prospective but cover virtually every industrialized country and region of note in the world.

The first chapter, "The Chemical Industry in the 21st Century," begins with an overview of what has been transpiring in US manufacturing as a whole. It is clear that most of the reporting in the popular press is woefully ignorant of what US Government statistics are showing and has preferred to take a sensationalist and misleading line, based on anecdotal situations that fit its own preconceived ideas. For example, the widely reported line that US manufacturing is being transferred overseas is flatly false. The data show that US manufacturing employment in large firms is indeed falling, but largely due to productivity gains, not transfer of jobs offshore. "Outsourcing" does not always mean "offshoring." There are a surprising number of new businesses that have been started since the end of the 2000-2003, employing more than 3.5 times the number of new positions in large companies. However, this job growth simply went largely unreported by the press, which persists in reporting only job number changes in established companies. The US chemical industry (which makes polymers, dear readers, so there is a connection here!) has also showed remarkable strength during the last recession, holding up better than US manufacturing overall in terms of companies, sales, employment, and payrolls; only in capital expenditures did it lose position overall. However, as mentioned earlier on these pages, the dysfunctional US energy policy is now genuinely threatening to drive much chemical manufacturing offshore. The chapter goes on to analyze US technical employment prospects, R&D spending trends, the influence of Wall Street on publicly held companies and how it has harmed those publicly held chemical companies, opportunities and perils in offshore countries, such as India and China.

We will review the chapters on the pharmaceutical industry and China in the next newsletter.

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Polymer Markets

TPE Markets/Technologies

Robert Eller Associates, Inc has recently completed their second multiclient study of TPEs in Europe and North America.
Some key conclusions from the study:

- "Crosslinked" SEBS or more appropriately SBC-TPV being offered by several SEBS (in Europe and N. America compounders based on Kuraray technology has entered the market and will become a co-challenger (with olefinic TPVs for markets held by EPDM)

-Reactor TPOs continue to gain in sophistication and ability to compete with SEBS and olefinic TPVs. An early example can be seen in the competition in the growing airbag door market in which several forms of TPO are gaining share at the expense of SEBS and compounded TPOs

-Compounders are diversifying their TPE product lines via joint ventures, marketing agreements . Bob Eller, President of REA says, "the days of the narrow product line, regional compounder are over"

-As expected, profitability has been hurt by raw materials price increases and tight pricing especially in the auto sector

-TPE market growth, especially in the consumer sectors, has been slowed by the transfer of end product manufacturing to Asia, especially China, a TPE market which REA is studying in a parallel study to be completed in March

TPE Compounding Technology and Fabrication processes: The REA study has documented how the automotive supply chain is compressing as Tier 1s look for cost savings via systems cost reductions. Direct compounding has become a factor in glass reinforced PP compounds and could potentially grow in the TPE sector.

The REA study found that two shot molding which has become a mainstay of high-end soft touch consumer products has been extended to large area, thin cross-section parts like door trim panels and (soon) to skinned instrument panels and will become a new competitive zone for SEBS and olefinic TPVs.
For more information on the study please visit: www.robertellerassociates.com or call 330-670-9566.

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Packaging
An Italian packaging company has introduced the first trays utilitizing foamed PLA (Polylactic acid Polymer) from Natureworks LLC for fresh carry-out foods like meat, fish, cheese, fruit and prepared foods. Coopbox Europe SpA of Reggio, Emilia, Italy is the manufacturer of the Naturalbox trays and they won the 2005 Packaging award from the Italian Packaging Institute. The sheet is made on a standard tandem foam extruder using CO_2 to reduce PLA's density form 1.25 g/cc to 0.40 g/cc. This can significantly reduce the cost of PLA that is coming closer to conventional olefinic materials. Natureworks is working with North American thermoformers on foamed PLA trays.
For more information contact: Natureworks, LLC at 952-742-0400.

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Polymer Developments
The second generation of TPEs that provide a superior bond/overmold to most types of standard and modified nylons -- sold under the tradename VERSAFLEX ® OM 6200 Series -- will be introduced by GLS Corporation at NPE 2006.
According to GLS officials, the new OM6200 series was developed to provide an excellent bond across the most nylon substrate types as well as most modified nylons. Varying the nylon type (6, 6/6, 6/6/6) or modifying the nylon with colorants, lubricants, impact modifiers like glass, or other common modifiers can significantly affect TPE overmold adhesion. The new OM6200 series grades were formulated to minimize the effects of these nylon modifications.

Another important advantage is in processing. Besides being developed to process in both insert molding AND 2 shot molding, the new grades do not require drying the TPE or the nylon substrate prior to molding. The OM6200 series also offer a wide processing window, fast cycle times, and excellent surface aesthetics.

Target markets include lawn and garden, hardware, hand and power tools, and other industrial applications where a soft touch is needed or vibration or noise damping is required.

The new grades are offered in natural and black, and range in hardness from 40 to 75 Shore A. But, as always, GLS can customize a specific nylon overmold TPE for a customers specific application.

For more information on the new nylon insert- or two-shot molding series of VERSAFLEX OM 6200 TPEs, contact: GLS Corporation, Telephone: (815) 385-8500 or (800) 457-8777. Fax: (815) 385-8533. E-mail: info@glscorp.com Web: www.glscorp.com.In Europe, contact: Mr. John Simons, Business Development Manager, GLS Intl.,Tel: 31 113 551 093. Fax: 31 113 551 094. E-mail: jsimons@glscorp.com. In Asia, contact: Mr. Wing Lau, Business manager, GLS Hong Kong Ltd. Tel: 011 852 2690 5330. Fax: 011 852 2690 5223. E-mail: wlau@glscorp.com.

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At the MDM/Plastec we learned that Nycoa has introduced a nylon elastomer and that Cyro/Degussa have combined efforts marketing Trogamid as well as the Cyro Acrylic line and Dupont Engineering Polymers announced a dedicated group formed to focus on medical applications

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Nylon Corp of America (Nycoa), Manchester, NH has introduced one of the first nylon TPEs that offeres all of the thermal and mechanical properties of Nylon 6 along with flexibility. Long chain flexible monomers are copolymerized with Nylon 6. The proprietary Nycolastic copolymer features high impact, abrasion and chemical resistance. Six grades range from 13,000 to 100,000 psi flexural modulus. The resins are targeted for soft-touch overmolding applications such as tool handles and footwear, extruded tubing and cable jacketing. Nycolastic bonds to other nylons, which facilitates overmolding and recycling. It is priced in the range of TPUs and other engineering grade TPEs. For more information contact: 1-800-851-2001.

Degussa/Cyro combined their marketing efforts at the MDM show exhibiting Trogamid® (transparent nylon) and well as the Cyro line. Degussa has also recently purchased the rights to Ticona's poly aryl ether ketones. Ticona did not market these materials, however Degussa plans to use this technology to add products in the PEEK family to its high performance resins business which includes Nylon 12, PBT, copolyamides and copolyesters.

Dupont exhibited at the show introducing their new grade of acetal copolymer Delrin SC662NC010. It has a very low volatiles emission, and low levels of formaldehyde, which is a concern since formaldehyde is classified as a carcinogen by the EPA. They are also promoting Hytrel polyester elastomer as a plasticizer free PVC replacement. We made note of this because DuPont in the past de-emphasized their involvement in medical device applications but today they have a team in Europe and in the US dedicated to the Healthcare market.

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Daicel Chemical Industries, Ltd. (Daicel Chemical), Polyplastics Co., Ltd. (Polyplastics) and Topas Advanced Polymers (TAP) jointly announced the consummation of acquisition of the cyclic olefin copolymer (COC, trademark: TOPAS®) business of Ticona, a wholly owned subsidiary of Celanese Corporation. Daicel Chemical and Polyplastics hold 55 percent and 45 percent interests in TAP, respectively, which was officially launched January 1, 2006.

TAP has been established in Frankfurt, Germany, and Florence, Kentucky, USA, as a member of Daicel/Polyplastics Group. It will take over Ticona's entire COC business, including employees, production and R&D facilities.

TOPAS COC has a strong reputation for having optical properties equivalent to PMMA (polymethyl methacrylate, an acrylic resin), thermal resistance superior to PC (polycarbonate), and dimensional stability greater than PMMA and PC. Additional properties are stiffness, very good compatibility with polyolefins and high water vapor barrier. It is a promising material for optical components, medical devices, packaging and applications in other industries.
TAP has acquired Ticona's assets in Germany, which include the production plant with an annual capacity of 30,000 metric tons and a research and development facility. The plant, located in Oberhausen in northwestern Germany, is the largest in the world for the production of COCs.
For more information visit: www.topas.com

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Archer Daniels Midland and Metabolix Inc have announced that they will build a plant capable of making 100 million pounds of PHA (polyhydroxyalkanoate), the first 100 per cent organic plastic. The goal is to have the plant operating by 2008. Neither company announced the location of the facility. PHA, based on corn sugar and made through a fermentation process, sells for about $1.50-$2.00 per pound but the goal would be to get the price under $1.00 per pound.

Commercial quantities of PHAs have never been widely available. Toyota and P&G have also done research and development in the area of PHA's . These materials primary replacement targets are Polyethylene, polypropylene and polystyrene. Despite PHA's ability to decompose quickly in in soil or marine environments, the product has more than adequate shelf life for numerous packaging applications.
PHA target applications include plastic cutlery, coated paper cups, bottle caps and cosmetic cases. They also see opportunities in one time use applications like foam coffee cups and lids and drinking straws. The first commercial application for PHA will be agricultural stakes commonly used in sod applications. PHA stakes will decompose, eliminating the need to dig up the stakes once the sod takes root. The stakes could be available later this year.
Metabolix acquired the biopolymer technology (formerly called Biopol™) from Monsanto Inc. in 2001.

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Process Developments

Randcastle Extrusion has recently patented a proprietary screw technology that looks to enable the single screw extrusion line to perform competitively with twin screw extrusion lines in film and compounding applications at a significantly lower capital investment. The „ Recirculator „ screw has been demonstrated in film applications to perform competitively with twin screw systems when color, fillers and additives are introduced in line. Randcastle has produced several commercial systems to date.
For more information, please contact: Keith Luker, 973-239-1150 or visit www.randcastle.com .

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Nanotubes
Both Chemical Week and Modern Plastics reported on the commercialization of a process for the production of nanotubes for plastics applications. Bayer Material Sciences recently disclosed that it has developed a catalyst that lowers the cost of manufacturing of nanotubes while maintaining stable production output. Two disadvantages to nanotubes have been high production cost ($1000.00 per kilo) and fluctuating product quality. Sigurd Buchholz, project head at Bayer Technology Services, has reported that the nanotubes are multi-walled tubes of up to 15 graphite layers. They have a maximum mean diameter of 50 nanometers or about 10,000 times thinner than a human hair. They can withstand mechanical loads 60 times better than steel at only one-sixth the weight. Bayer can custom manufacture carbon nanotubes with different diameters, lengths, and wall thicknesses.

Carbon Nanotubes can allow surfaces such as vehicle body parts to become so electrically conductive that they can be painted without a pretreatment. Other applications include films for antistatic packaging nad electromagnetic interference shielding for cell phone housing and computers.

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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