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# Paperbase Alerting Service Sample

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Synthetic paper, nonwovens and  
nonwoven products and composites

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PI: 20204070 JA: 0203

TI: Role of paper sludge particle size and extrusion temperature on performance of paper sludge-thermoplastic polymer composites

AU: Son J; Kim H J; Lee P W

JN: J. Appl. Polym. Sci. \$IS=

CI: vol. 82, no. 11, 9 Dec. 2001, pp 2709-2718 (S)

CT: COMPOSITE/ PAPER/ PARTICLE SIZE/ PHYSICAL PROPERTIES/ SLUDGE/  
THERMOPLASTICS/

AB: Since the US pulp and paper industry generates about 45kg of sludge per tone of pulp, this means that 4m dry tons of sludge are produced by the industry annually, causing severe environmental problems. One possible environmentally-friendly application of paper sludge is as a filler for thermoplastic polymer composites. A study was undertaken to determine the effect of the particle size and extrusion temperature of the paper sludge on the physical and dimensional stability, tensile, flexural and impact properties of paper sludge-thermoplastic polymer composites. Experiments were conducted to using three levels of particle sizes for the paper sludge and four extrusion temperatures. The swelling thickness, water absorption, and tensile and flexural strengths of the composite were found to be improved by decreasing the particle size of the paper sludge, while the unnotched impact strength was unaffected by the particle size. The thickness swelling and water absorption of the composites were slightly improved with increased extrusion temperature, but not to a statistically significant extent. Increased extrusion temperature generally had a positive effect on the tensile and flexural properties of the composite. While the notched and unnotched impact strengths of the composite increased with increased extrusion temperature, from 190-230 deg C, these properties decreased slightly at an extrusion temperature of 250 deg C, suggesting that the mechanical properties at this extrusion temperature are due to excessively brittle fibres resulting from thermal decomposition. (19 fig, 1 tab, 7 ref)

SO: B

00002

PI: 20204127 JA: 0203

TI: Next generation nonwoven fabrics

AU: Anon

JN: Asian Text. Bus. \$IS=1346-3276

CI: no. 564, Nov. 2001, 16-18 (P)

CT: FABRIC/ NONWOVEN INDUSTRY/ NYLON/ POLYESTER/ SPUNLACED NON-  
WOVEN/

CN: DuPont; Japan Vilene; PGI Nonwovens

AB: Three "next generation" nonwovens with different manufacturing methods are discussed. Evolon is a polyester and nylon ultra-fine microfibre nonwoven by Japan Vilene. It is made by a spunlacing method which splits and compactly entangles the fibres. Dyeing and finishing technology is still under development. PGI Nonwovens, USA, produces Miratec using its original Apex technology. This fabric is characterised by the possibility of diverse patterns using laser technology. Sales rights in Asia are held by Marubeni Corporation who has successfully marketed the fabric in jeans by Levi Strauss Japan, and in a fashion show by Yumi Katsura. It is jointly developing applications with Komatsu Siren Co Ltd, and PGI Nonwovens is working on quality improvements using 60% cotton:40% polyester blends. DuPont USA has introduced Inova, a combination of Lycra and flash-spun Tyvek. If the various fabrics can raise their levels of quality through competition with each other, they may secure a hold in the outerwear sector.

SO: B

00003

PI: 20204132 JA: 0203

TI: Hygienic fabrics

AU: Anon

JN: BTTG Indep \$IS=

CI: Nov. 2001, p. 3 (P)

CT: ANTIMICROBIAL SUBSTANCE/ FABRIC/ HYGIENE/ NONWOVEN INDUSTRY/

AB: Methods of applying anti-microbial agents to fabrics, and proposals for standardised test methods for hygienic fabrics are briefly discussed. Examples are tabulated of textiles and their producers using use topical applications, covalent linking or grafting, encapsulation within the fibre, and lamination. A single test method would be inappropriate due to variation in types of textiles and end uses. A test proposed by the Japanese has been accepted as a work item within ISO/TC38/-/WG23. BTTG, UK, represents the UK at WG23 meetings and will provide updates from the working group via its website.

SO: B

00004

PI: 20204134 JA: 0203

TI: Protecting the firefighter: a ground breaking project from BTTG

AU: Anon

JN: BTTG Indep \$IS=

CI: Nov. 2001, p. 13 (P)

CT: FIRE FIGHTING/ NONWOVEN INDUSTRY/ PROTECTIVE CLOTHING/ TESTING/

AB: BTTG and Fire Testing Technology Ltd launched a project on 25 October 2001 to develop a gender based manikin test system of flame engulfment for firefighters' PPE. The project, responding to the increasing number of women firefighters in the UK, is supported by the Chief Inspector of the Fire Service, the Chief and Assistant Chief Fire Officers' Association and the Fire Brigades Union. The proposed system extends beyond the capabilities of BTTG's RALPH male manikin test system, complying with the ISO method in male and female mode. It will study the effectiveness of PPE ensembles in protecting the firefighter, and incorporate a higher density of sensors at PPE interfaces. Performance will also be assessed on dressed manikins during flame engulfment tests. (Short article)

SO: B

00005

PI: 20204148 JA: 0203

TI: Impact fatigue behaviour of vinylester resin matrix composites reinforced with alkali treated jute fibres

AU: Ray; Sarkar B K; Bose N R

JN: Composites: Part A

CI: vol. 33, no. 2, 2002, pp 233-241 (P)

CT: COMPOSITE/ FATIGUE/ JUTE/ NONWOVEN INDUSTRY/ PROPERTIES/ REINFORCEMENT/

AB: The impact fatigue behaviour was studied for vinylester resin matrix composites reinforced with untreated and alkali treated jute fibres. Fatigue curve analysis was used to assess the fatigue resistance properties, and the nature of failure under fatigue was investigated by examining fracture surfaces under scanning electron microscopy (SEM) using single and repeated impacts. Longer alkali treatment improved crystallinity and fibre dispersion. Composites treated for 8h in alkali showed the highest fatigue strength, followed by untreated, then 4h treated composites. The 4h treated composites had superior flexural properties which were not reflected in their impact fatigue behaviour. (10 fig, 5 tab, 24 ref)

SO: B

00006

PI: 20204153 JA: 0203

TI: Membrane based electrostatic precipitation

AU: Alam M K; Bayless D J

JN: Filtration Sep. \$IS=0015-1882

CI: vol. 38, no. 9, Nov. 2001, pp 28-31 (P)

CT: EMISSION CONTROL/ MEMBRANE/ NONWOVEN INDUSTRY/ PRECIPITATOR/

AB: Researchers at Ohio University (OU) have developed an electrostatic precipitator (ESP) using membranes to replace heavy plates, for the removal of emissions from coal burning power stations. Membrane technology has the potential to reduce costs and increase particle capture efficiency, helping to meet proposed US Environmental Protection Agency (EPA) PM2.5 regulations. Although ESPs remove 99% of most particulates from gas emissions they are at their lowest efficiency for particle sizes between

0.1-1.0mm, the focus of the new regulations. Dry ESPs suffer re-entrainment losses, and wet ESPs are not particularly suited to gaseous removal. OU has patented a membrane which addresses the problems. The experiments carried out during its development are described. The ESP has been tested for collection efficiency, electrical resistivity, corrosion resistance, wetting properties, combustibility and mechanical strength. Fibre based materials display excellent collection and wetting properties, distributing water by capillary action over the entire membrane, enhancing particle collection and preventing build-up of salts. Further research focuses on optimisation and other application areas. (3 fig, 4 ref)

SO: B

00007

PI: 20204154 JA: 0203

TI: Meltblown nanofibres for nonwoven filtration applications

AU: Ward G

JN: Filtration Sep. \$IS=0015-1882

CI: vol. 38, no. 9, Nov. 2001, pp 42-43 (P)

CT: MELTBLOWN FIBRE/ NONWOVEN INDUSTRY/ POLYPROPYLENE/

CN: Nonwoven Technologies Inc

AB: Nonwoven Technologies Inc, GA, USA, has developed a thin-plate die technology which may be the key to cost-effective production of meltblown nanofibres. Existing technology for producing these fibres, with a mean diameter of less than one micrometer, is limited and costly. Extremely small polymer orifices and low flow rates are required. The new die system uses an integrated series of thin plates sequentially stacked in a holder to provide blowing air and polymer extrusion orifices. It can presently provide orifices of 0.025mm diameter. The system has advantages such as high running pressure capability, a design immune to unzipping, and multiple extrusion rows. It is applicable to a wide variety of materials. Webs have been made using a wide range of melt-flow polypropylenes. A 35MF polypropylene produces fibres with an average diameter of 320 nanometers. Research continues into narrowing fibre size distribution and reducing average fibre diameter. The thin plate technology is described in US patents US5679379 and US6114017. (1 fig)

SO: B

00008

PI: 20204159 JA: 0203

TI: Hybrid carbon fibre reinforced plastic

AU: Anon

JN: New Mater. Jpn \$IS=0265-3443

CI: Dec. 2001, p. 10 (P)

CT: CARBON FIBRE/ COMPOSITE/ NONWOVEN INDUSTRY/ REINFORCED PLASTIC/

CN: Toray Industries Inc

AB: Toray Industries Inc, Tokyo, Japan, has developed a novel carbon fibre reinforced plastic for applications requiring a flexible but shatterproof material. It contains unidirectionally aligned high-elongation fibre bundle regions separately disposed within the plastic component. The resulting lightweight material is strong, but if broken, unlikely to cause injury from shattered fragments or exposed fracture surfaces. The plastic could

be used in sporting goods such as ski-poles, and industrial structural materials. (Short article)  
SO: B

00009

PI: 20204161 JA: 0203

TI: Driving innovation

AU: White C F

JN: Nonwovens Rep. Int. \$IS=

CI: no. 368, Nov. 2001, pp 8-10, 12, 14, 16, (P)

CT: ABSORBENT/ HYGIENE/ INCONTINENCE/ NONWOVEN INDUSTRY/  
SUPERABSORBENT/

AB: New products, technology and commerce are examined in a review of the absorbent hygiene products market. Innovations in the baby care, feminine hygiene and adult incontinence sectors are reviewed and illustrated. Absorbent cores in nappies are now rectangular, profiled and contain granular superabsorbents. Most manufacturers use acquisition/distribution layers but adopt different approaches to avoid contravening patents. The amounts of components used in different nappy brands are tabulated. In feminine hygiene ultra thin products are gaining market shares and research has led to the development of microporous breathable backsheets. Single and double drum, ultra thin wing and fluff filled wingless structures are illustrated. Belt type adult incontinence products have been designed for easier fastening and adjustment. Short fibre airlaid processes are emerging to produce the pre-formed core materials. Web forming, handling and roll delivery systems are described. A selection of news items from Sept. 2000- Aug. 2001 is listed. (9 fig, 2 tab)

SO: B

00010

PI: 20204165 JA: 0203

TI: Man-made drivers

AU: Benisek L

JN: Nonwovens Rep. Int. \$IS=

CI: no. 368, Nov. 2001, pp 30-31 (P)

CT: AUTOMOTIVE INDUSTRY/ NONWOVEN INDUSTRY/ TEXTILE/

AB: The 15m new cars produced in Europe in 2001 will require 45,000t of PES textiles. The European Union Directive on End of Vehicle Life presents challenges and opportunities to the nonwovens industry, requiring at least 85% of car weight to be recyclable from 2006. This has led to projects such as German Audi's Caliweb nonwoven replacements for polyurethane foam. BMW has produced its own standard for vehicle recycling, to meet future EU regulations. For seat belts Honeywell Performance Fabrics, France, has introduced Securus, a fibre based on a patented copolymer, which absorbs three times as much energy as traditional polyethylene terephthalate (PET) materials. Enhanced energy absorption and lower weight than aluminium or steel is also offered by fibre reinforced composites. The airbag market is expected to grow from 250m sq m to 380m sq m by 2008 due to increased positions of use. In evaluating the dyeing processes for car seat covers, spun dyed is more ecologically responsible than yarn dyed and has performed better in ageing tests by Acordis.

SO: B

00011

PI: 20204172 JA: 0203

TI: Two-step success

AU: Berghaus U

JN: Text. Mon. \$IS=0040-5116

CI: Nov. 2001, p. 26 (P)

CT: COMPOSITE/ FILM/ NEW PROCESS/ NONWOVEN INDUSTRY/ SPUNBONDED NONWOVEN/

AB: A new process is detailed for making composites of film and spunbonded nonwoven fabrics. The existing three step method of nonwoven production, film production and lamination is cut to two by German company Reifenhauer's direct coating method. The nonwoven web is coated using a modified casting roll and electrostatic field, making the composite directly from the melt without mechanical pressure. Low coating weights are possible, and the textile nature of the composite retained. By using individual components instead of prefabricated compounds, raw material costs can be halved. Reifenhauer has formed an alliance with Hills Inc, FL, USA, to extend both companies' ranges of nonwovens machinery. Features will include Hills' multi-component technology, Reifenhauer's Reicofil Closed Systems spin tower and Hills' Open System spin tower designs incorporating fibre quenching systems.

SO: B

00012

PI: 20204175 JA: 0203

TI: Automotive textiles: still one of the hot markets?

AU: Smith W C

JN: Text. World \$IS=0040-5213

CI: vol. 151, no. 11, Nov. 2001, pp 69-70, 72-73 (P)

CT: AUTOMOTIVE INDUSTRY/ NONWOVEN INDUSTRY/ TEXTILE/

AB: Despite a downturn in the world economy, and cutbacks by car manufacturers, there are still market opportunities for creative innovative products. New materials are meeting requirements for higher quality textiles such as synthetic leather and suede. More uses are developing for airbags, with fabric consumption expected to reach 325sq m by 2005. Spunbond nonwovens have found a niche in interior fabrics, and offer advantages in recyclability. Nonwovens also provide alternatives to polyurethane foam in seating. Other possibilities suggested include the concept of a single polymer system for car interiors, and the use of phase change materials (PCM)s in air conditioning. With knowledge of the customer and an understanding of the market, there are opportunities for products which meet the high technical standards required by Tier 1 and Tier 2 suppliers. (4 fig)

SO: B

00013

PI: 20204636 JA: 0203

TI: More nonwovens information into Paperbase

AU: Kaariainen A

JN: KCL tiedotta KCL Inf. \$IS=0359-0704

CI: no. 2, 2001, p. 2 (C, K, P, S)

CT: DATABASE/ INFORMATION RETRIEVAL/ NONWOVEN/

AB: Paperbase, the world's most comprehensive database for the pulp and paper industry is to increase the amount of nonwovens information from the Summer of 2001. The number of magazines being covered increasing from around 260 to over 300, while the number of conference publications to be continuously scanned will increase by around 12. The Nonwovens database of some 30,000 records, previously maintained by Pira, will be merged with Paperbase, which will grow to a total of over 15,000 records. The classification code and index list will be expanded to include 12 new classes and the index list will be provided with around 80 new index terms. Paperbase can also be accessed via the web site [www.paperbase.org](http://www.paperbase.org) and will also soon become available via the Knowledge Warehouse information retrieval system maintained by [paperglobe.com](http://paperglobe.com).  
SO: B

00014

PI: 20204755 JA: 0203

TI: About air filters

AU: Isohashi K

JN: Jpn Nonwovens Rep. \$IS=0286-0988

CI: no. 10, Oct. 2001, pp 6-9 (P)

CT: AIR FILTER/ FILTRATION/ NONWOVEN INDUSTRY/

AB: Air filters can be classified into four grades according to dust collection performance: filters for large particles (pre-filters), middle efficiency, high efficiency and extremely high efficiency filters. Dry nonwovens are generally used for large-particle use in the form of panels or rolled filters. Washable and disposable types are available. For middle or high efficiency filters, glass-fibre nonwovens, dry nonwovens of fine fibres, wet nonwovens, melt-blown nonwovens and electret nonwovens are common materials, and take shape of bags or "fold-in" units. These filters are normally single-use only, but as ultrasonic cleaning technology advances, reusable filters are under review. Extremely high efficiency type like high efficiency particulate air (HEPA) or ultra low penetration air (ULPA) filters have appeared in household air conditioners and air purifiers. Like middle and high efficiency types, pleated filters are folded into the unit. Travelon air filter range from Kanai Juyo Kogyo KK, Japan, emphasises resource-saving and environmental protection. Travelon pre-filters include halogen-free filters and heat resistant types for dryers in car paint-shops. For middle/high efficiency grade, filters with large air capacity and small depth size are available, saving space and extending filter life. Gas-removal filters for semi-conductor manufacturing, Pure Home N and H, have been launched in cooperation with Nihon Pure Tech. Anti-bacterial filters are also available. (3 tab)

SO: B

00015

PI: 20204756 JA: 0203

TI: Product development from more innovative ideas to contribute to environmentally-friendly society

AU: Anon

JN: Jpn Nonwovens Rep. \$IS=0286-0988

CI: no. 10, Oct. 2001, pp 10-11 (P)

CT: FILTRATION/ NONWOVEN INDUSTRY/ PRODUCT DEVELOPMENT/

CN: Frontier Sangyo KK

AB: Since its entry to filter business in 1985, Frontier Sangyo KK, Japan, has responded to diversifying market demand by innovative product development and composite processing technology. Their product range includes dust-collecting filters for air conditioners, deodorant filters for humidifiers, dehumidifiers, ceramic heaters or extraction fans, activated carbon filters, activated carbon fibre filters, photocatalyst filters and aluminium-honeycombs. They also manufacture and process soundproof, vibration-proof, airtight and insulating materials. A new product containing bicho-tan charcoal is increasing application in home electric appliances like vacuum cleaners and futon dryers, car air-conditioners, clothes covers and shoe liners. New humidifier using Frontier's high-bred-type water absorptive filter is noted for its huge reduction in electricity consumption. To meet further market demand, Frontier has introduced electret processing equipment and hot-melt foam-form system. Currently development is underway for hot-melt polyamide preventing creation of hazardous gases at incineration, and its production is expected to start in early 2002. Frontier is keen to explore new business opportunities, and anticipates growing market for cabin filters of car interior, which are standard for luxury cars but will be fitted in even middle-grade cars from spring 2002. (6 fig)

SO: B

00016

PI: 20204757 JA: 0203

TI: Responding to environmentally-friendly society: Firedon air filters

AU: Tomioka T

JN: Jpn Nonwovens Rep. \$IS=0286-0988

CI: no. 10, Oct. 2001, pp 12-15 (P)

CT: ENVIRONMENT/ FILTRATION/ NONWOVEN INDUSTRY/ RECYCLING/

CN: Japan Vilene

AB: Japan Vilene Co Ltd has been working on environmental solutions for their Firedon brand. As for general air-conditioner filters, "FR-585" halogen-free roll filter is used for primary air treatment, and "PS Series" are washable types for primary air treatment or pre-filter for middle-efficiency filters. Middle and high-efficiency filter, "Philo-topia", allows easy replacement for filtration medium while the frame is reused, contributing huge waste reduction. In car paint-shops FR-585 and PS Series can be used as primary filters, and chlorine-free bag filter "VG-40" is available for secondary filters. PA/305 and PA/350N are used as tertiary filters, also chlorine-free and effective to prevent dioxin and damaging incinerators. New chemical filter for semi-conductor manufacturing has been developed using sheet-forming technology for activated carbon grains, and all the materials used for the filter, frame, adhesives, packing and packaging were checked to avoid secondary contamination. Japan Vilene's recycling system for used filters has started operation at NKK steel furnace since April, 2001. Used filters are broken into grains and used for deoxidisation for iron ores. Grained filters are also recycled to make gas to fuel ironworks, and the ashes of the grains are recycled to make gas, cement or roadbed materials. (3 fig, 1 tab)

SO: B

00017

PI: 20204758 JA: 0203

TI: Nonwovens Technical New A la Carte: basic ideas on filtration

AU: Takaoka Y

JN: Jpn Nonwovens Rep. \$IS=0286-0988

CI: no. 10, Oct. 2001, pp 27-32 (P)

CT: AIR FILTER/ FILTRATION/ NONWOVEN INDUSTRY/

AB: Nonwovens have 3-dimensional net structure, and by utilising this feature non-woven filters have been developing. Either surface or inner filtration takes place in air filters, and the latter mechanism is applied to high efficiency filters while the former to ordinary air conditioner filters, bag filters and membrane filters. Void formation in filter material, and type, structure and form of fibres making the material are key factors for filter characteristics, and according to requirements fibre size is selected and complex manufacture is designed. Manufacturing filter materials is roughly divided into wet and dry nonwoven types. Wet nonwovens are made from sheet forming of short fibres and pulp bonded by hydrogen or adhesives, and used for automobile engine air filters, oil filters and vacuum cleaner filters. Various types of dry nonwoven manufacturing methods, technology of making very fine fibres and combined use of processes have produced a wide range of filter materials covering from large-particle use to extremely high-efficiency types. For forthcoming development of dry nonwoven filters, safety of filter disposal will be more emphasised as well as energy saving by reducing filter pressure loss. Also prolongation of filter life and solution for filter cleaning to allow reuse must be explored. (2 fig, 3 tab, 6 ref)

SO: B

00018

PI: 20204759 JA: 0203

TI: Developments and trends of FWP cores/rolls

AU: Shizume S

JN: Pap. Film Foil Converttech Pac. \$IS=

CI: vol. 9, no. 4, Oct. 2001, pp 16-19 (P)

CT: COMPANY INFORMATION/ CORE/ FIBREGLASS REINFORCED PLASTIC/ FRP/ TECHNOLOGY TRENDS/

AB: Chiyoda Kogyo Co Ltd has developed a range of filament winding plastics (FWP), a type of fibreglass reinforced plastics (FRP) using the manufacturing technology of its affiliate Tenryo Kogyo Co Ltd. FWP cores date back to the 1970s when they were introduced for bobbins used in silk reeling in its initial stages, from whence they have moved to penetrate rapidly the market for lightweight, high strength cores for films, particularly non-textile polyethylene terephthalate (PET). FWP cores are lighter than aluminium and have a tensile strength comparable to that of hard vinyl chloride. They can also be repaired or fitted with protective ends when used in pipe manufacture. They can be used as a conductive antistatic plastic coating and have minimal coefficient of linear expansion. Rolls with greater rigidity than metal rolls can be produced with appropriate choice of materials. Typical examples of applications of FWP cores include: polyethylene terephthalate (PET) film manufacturing, polyamide/polyaramide manufacturing, composite film manufacturing, paper manufacturing, and the manufacture of sensitive materials, such as photographic materials, metal foil and glass cloth. Chiyoda Kogyo has established a subsidiary in Indonesia called PT Chiyodakogyo Indonesia. (4 fig, 1 tab)

SO: B

00019

PI: 20205090 JA: 0203

TI: Technology trends in laundry and household products

AU: Berge P

CI: IDEA 2001: international nonwovens conference and exposition, Miami, FL, USA, 27-29 March 2001, 9pp <Cary, NC, USA: Inda: Association of the Nonwovens Fabric Industry, 2001, USD170.00> (P)

CT: CLEANING/ CONFERENCE/ HOUSEHOLD PRODUCT/ HYGIENE/ NONWOVEN INDUSTRY/ SUBSTRATE/

CN: Association of the Nonwovens Fabric Industry; Indal

AB: A study of nonwoven technology trends in laundry and home care applications was conducted. It covered commercial products in the European, North American and Far East markets. Home care applications include dry surface cleaning wipes, wet wiping products and antibacterial wipes. Significant growth is reported in new products with nonwoven substrates, for use in fabric care. Categories include stain removal, washing, drying and storing. Common requirements for substrates that were identified from the study include lotion or liquid absorption and release, lint free wet and dry integrity, dust or particle collection and holding ability and consumer friendly qualities. Technology trends connected with these characteristics include increased use of polyester and cellulose, carding during web formation, entanglement during bonding and 3D structures. The use and benefits of composite structures, microfibres, polyethylene and spunbond are also mentioned.

SO: B

00020

PI: 20205091 JA: 0203

TI: New product opportunities in consumer markets

AU: Hanna P; Starr J R

CI: IDEA 2001: international nonwovens conference and exposition, Miami, FL, USA, 27-29 March 2001, 12pp <Cary, NC, USA: Inda: Association of the Nonwovens Fabric Industry, 2001, USD170.00> (P)

CT: CONFERENCE/ FABRIC/ HOUSEHOLD PRODUCT/ HYGIENE/ NONWOVEN INDUSTRY/

CN: Association of the Nonwovens Fabric Industry; Inda

AB: The market for nonwoven fabrics in consumer products reached USD1.5bn in 2000. Nonwoven fabric applications in these products include personal hygiene and household products and fabrics, coatings and laminations for carpets, wall coverings, upholstery and shoes, laundry products, home air filters and tea bags. Continued progress on the functional performance and added value of the nonwoven ingredients improves existing products and extends the life of products in mature categories. Examples include new floor cleaning systems in the household cleaning category, home dry cleaning products, stain removal swipes, facial and body cleansing wipes and water dispersible roll wipes in the bathroom tissue category. Leading companies with new nonwoven products in the consumer product portfolios include Proctor and Gamble, Kimberly-Clark, Unilever and Clorox. Continuing success is predicted for these nonwoven products with new opportunities for further development of nonwoven technology. Increased demand is reported for spunlaced fabrics such as Polymer Group's APEX, carded thermal bonded composites such as Ultramesh and 3D forming technology. (6 fig)

SO: B