2009 North American Elastic Nonwovens Technology Leadership of the Year Award

Kraton Polymers LLC

The 2009 Frost & Sullivan North American Technology Leadership of the Year Award in the field of elastic nonwovens goes to Kraton Polymers LLC in recognition of its on-going measures to lead innovation in the field of styrenic block copolymers (SBCs). In addition to pioneering the development of styrenic block copolymers, the company has established itself as an innovator in this field over the past four decades. Its new family of styrenic block copolymers, the MD6705, G1643, and MD6717 grades, which are suitable for a wide variety of applications that demand superior qualities of softness, breathability, and elasticity, are a result of its intense R&D efforts and drive to develop innovative solutions in this sector.

The company's innovative technology allows the block copolymer to effectively undergo high-speed processing without losing its most desired properties. In addition to this, it is also suitable for applications that require fewer processing steps. Kraton Polymer's grades for spunbond applications make up the elastic core in the bicomponent construction of an elastic yarn or an elastic nonwoven, which are drapeable, non-tacky, and breathable. Commercial spinning speeds have been recorded with fabric weights in the range of 40 to 110 gsm. Kraton Polymer's product is particularly suitable due to advantages both with respect to processing as well as nonwoven properties.

Company Background

Kraton Polymers has been offering unique solutions and performance advantages for a variety of commercial applications. In the 1960s, Kraton Polymers was the first to produce styrene-butadiene-styrene (SBS) polymers for footwear. This was followed by the use of styrenic block copolymers in adhesives and sealants during the 1970s. Kraton G polymers were introduced during this period and these polymers are now used in various applications such as oil gels for telecommunications, impact modifiers for engineering thermoplastics, elastic components in personal care, and applications

where high clarity and excellent impact properties are desired. The 1980s saw Kraton D polymers being used for roofing and road applications, as they increased the durability and improved resistance to rutting and low-temperature cracking. More recently in the 1990s, Kraton Polymer's styrenic block copolymer formulations were identified for their wide hardness range, ease of colorability, and ultraviolet stability. Today, with over 40 years of experience in high performance polymer innovation, Kraton Polymers has succeeded in leading the world's SBC production. Kraton Polymers has production facilities in the United States, Germany, France, The Netherlands, Brazil, and Japan, Kraton Polymers currently holds the leading position as being the only global producer of SBC materials. In addition, Kraton has a global R&D and Technical service network with technology centers in the US, South America, Europe and Asia. Kraton Polymers maintains an international workforce, a wide customer base in over 120 countries and a consistent innovation record. Kraton Polymers is regarded as the SBC pioneer in terms of sales, production, and R&D.

Relevance in the Market Place

Over the years, many technologies have been developed in the elastic nonwoven market, which primarily seeks to balance cost and performance. However, most of the conventional procedures do not offer high-processing rates, and they require multiple production steps. Currently, most elastic nonwoven fabrics are made via an expensive lamination process using an elastic film sandwiched between two non-elastic polypropylene spunbond fabrics. This new technology can achieve good elasticity and strength with a single elastic spunbond fabric, thereby eliminating the need to laminate three layers. In addition, the resulting elastic fabrics offer a soft hand, and good drape-ability.

The elastic melt blown grade allows customers who do not have bicomponent fiber technology to replace the elastic film in the current laminated constructions. The resulting spunbond-melt blown-spunbond (SMS) laminate could be made in a single step process, which would provide a significant manufacturing cost reduction.

Technology Overview and Innovative Features

In this context, Kraton Polymers LLC has developed a styrenic block copolymer formulation that is suitable for high-speed processing and retains all of its core properties during the nonwoven process. Of the three grades offered by Kraton, the MD6705 and G1643 are for spunbound applications while the MD6717 grade is suitable

for meltblown. Key features seen with Kraton Polymer's polymer-based nonwovens are that they are drapeable, non-tacky, and breathable. They also lead to products that are soft and discrete. This is in direct correlation with the current nonwoven industry needs that comprise of high-speed processability, breathability, comfort, high elasticity, and non-tackiness.

The technology behind Kraton Polymer's product development is that of an SBC polymers that can be used as an elastic core in bicomponent construction, the sheath of which can be polypropylene, copolyester, or nylon. This ensures the leveraging of the existing high-speed processing while still maintaining the elasticity. This is particularly so because the finished product from the nonwoven process will have the elastic core coated with a thin sheath of a non-sticky substitute with the appropriate surface properties. The unique aspect of Kraton Polymer's development relates to copolymer's nature. For a polymer to withstand high-speed processing, it requires low viscosity at high temperature resistance. However, most of the polymers at high temperature and low viscosity do not have the desired elasticity. Thus, the competitive advantage of Kraton Polymer's product lies in the design and optimization of the copolymer to retain its elasticity, while still making it suitable for high-speed processing.

Kraton Polymer's product design also offers the manufacturers the scope to customize the nonwoven product for different applications. The polymer allows the benefit of altering properties such as the shape of the nonwoven, core sheath ratio, weight and structure of the nonwoven, and so on. Another notable feature with Kraton Polymer's product is that it is highly compatible with polypropylene. This is of value particularly during the making of personal care products, where trimmed waste is likely to result; in such cases, it is easier to recycle the combined Kraton Polymers product and polypropylene. In addition to being in tune with the recycling trend, this feature also offers the benefit of reusability and cost effectiveness to the manufacturer.

Already, high-speed commercial runs of the grade MD6705 has been demonstrated on Hills and Reifenhauser lines, with sheath materials such as polypropylene and copolyester. Core/sheath ratios of 70/30 up to 90/10 have also been used. The key processing advantages for Kraton Polymer's product includes high process stability, no requirement of pre-drying, single-step conversion from pellet to fabric, commercial spinning speeds, and no post-processing wait times. In terms of its nonwoven properties, MD6705-based materials are elastic and strong, while that of the MD6717 are soft, have a high elongation at break and isotropic properties. The latter can also be combined with bicomponent spunbound nonwovens to achieve high elasticity and

strength. On a generic scale, the nonwoven properties in Kraton Polymer's product grade include biaxial elasticity, high-elastic recovery, dry non-tacky surface, soft drape, higher durability of elasticity, design flexibility, and even printability, depending upon the application needs.

Kraton Polymer's products are highly regarded for their compatibility with other materials creating the opportunity for a wide range of potential applications. These products include diaper waistbands and ear tabs, training pant side panels, adult incontinence cover sheets, feminine hygiene products, medical devices, food services, automotive, sporting goods, and a variety of other industrial applications.

Best Practices

Kraton Polymers has over 900 patents and 500 additional patents have been filed. With a strong innovation strategy coupled with a well-built research and development base, Kraton Polymers has continuously developed novel products, technologies, and solutions for the industry. Its most recent innovations include technology breakthroughs in tie layers, hot melt butyl sealants, isoprene rubber latex, polyvinyl chloride (PVC) alternatives, enhanced rubber segment (ERS) polymers, and newer adhesives. In the future, the company is likely to focus on improved asphalt modification, advanced foaming technology, revolutionary medical applications, and superior fiber applications.

As a marker for its commitment toward safety and the environment, Polymers has recently announced the introduction of a new global material safety data sheet/safety data sheet (MSDS/SDS) management system for its commercial products. In addition, in 2008, Kraton Polymers succeeded in implementing REACH and the Globally Harmonized System of classification and labeling of chemicals (GHS). In the event of a customer request, the product management system will allow the communication of global regulatory information through the MSDS/SDS documentation. These initiatives are undoubtedly indicative of Kraton Polymer's commitment toward the meeting of regulatory standards and the provision of systematic information for its customers.

Conclusion

The 2009 Frost & Sullivan North America Technology Leadership of the Year Award recognizes Kraton Polymers LLC for consistently providing high quality SBCs over the past four decades. The company's polymers are key ingredients that serve to improve performance in a broad range of applications. Particularly, this Award commends the company's efforts in developing a new generation of polymer grades suitable for high-speed processing in nonwoven manufacture. The Award also commends the optimization behind the product development that has succeeded in offering advantages both with respect to processing and nonwoven properties. Owing to its innovative properties and an extensive application profile, Kraton Polymer's product is likely to set a prominent benchmark in the industry. With this new development, Kraton Polymers has cemented its position as a leading technology innovator in the SBC industry.

Award Description

Frost & Sullivan's Technology Leadership Award is bestowed upon a company that has pioneered the development and introduction of an innovative technology into the market; a technology that has either impacted or has the potential to impact several market sectors. This award recognizes a company's successful technology development that is expected to bring significant contributions to the industry in terms of adoption, change, and competitive posture. It also recognizes the leadership of the company in the successful promotion of the technology and its continuing impact in technology commercialization.

Research Methodology

To choose the award recipient, Frost & Sullivan's analyst team tracks technology innovation in key hi-tech markets. The selection process includes primary participant interviews and extensive primary and secondary research via the bottom-up approach. The analyst team shortlists candidates based on a set of qualitative and quantitative measurements. The analysts also consider the pace of technology innovation, and the potential relevance or significance of the technology to the overall industry. The ultimate award recipient is chosen after a thorough evaluation of this research.

Measurement Criteria

In addition to the methodology described above, there are specific criteria used to determine the final rankings. The recipient of this award has excelled based on one or more of the following criteria:

- Significance of the technology in the industry
- Competitive advantage of technology vis-à-vis competing technologies
- Potential of technology to become an industry standard or degree of acceptance in the market place
- Breadth of intellectual property ownership
- Recognition by industry participants as to the leadership of a company in this technology
- Impact of technology in terms of shifting R&D focus
- Degree of technology adoption in industry product lines or strategies.

About Best Practices

Frost & Sullivan Best Practices Awards recognize companies in a variety of regional and global markets for demonstrating outstanding achievement and superior performance in areas such as leadership, technological innovation, customer service, and strategic product development. Industry analysts compare market participants and measure performance through in-depth interviews, analysis, and extensive secondary research in order to identify best practices in the industry.

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