US demand to jump 20.1% per year through 2009

Demand for metallocene and single-site polymers is projected to advance more than 20 percent per year to 5.1 billion pounds in 2009, valued at $5.3 billion. Opportunities will result from the considerable processing and performance advantages these materials hold over other materials. More rapid advances will be constrained by high metallocene and cocatalyst costs, and the introduction of more competitive Ziegler-Natta catalyst systems. Linear low density polyethylene (LLDPE) will remain the dominant polymer, although more rapid growth is expected for much smaller polypropylene and high density polyethylene plastics, as well as elastomers such as thermoplastic olefins (TPOs). Film and sheet will remain the leading application based on the importance of LLDPE in diverse packaging, construction and other uses.

Metallocene catalyst technologies allow an unprecedented degree of customization during polymerization, facilitating the cost-effective production of polymers with enhanced performance qualities such as higher strength, improved clarity and better processability. Compared with polymers produced with conventional catalysts, metallocene and single-site polymers are thinner but tougher, more resistant to puncturing and tearing, and clearer and glossier for more appealing and cost-effective packaging and other products.

Metallocene film, sheet to reach 2.8 billion pounds

Metallocene and single-site polymers are expected to account for about nine percent of all polyolefin polymers in 2009. Penetration rates will vary, with the highest anticipated for ethylene-propylene diene monomer (EPDM) rubber at 44 percent in 2009, and LLDPE at 24 percent. Demand for metallocene film and sheet, the leading application for metallocene polymers, will rise rapidly through 2009 to 2.8 billion pounds. Film and sheet uses for LLDPE are particularly amenable to the performance and processing advantages offered by metallocenes (particularly their enhanced clarity). Uses include stretch film, shrink film, overwrap, trash bags, and films for meat and dairy products, fruits and vegetables, and frozen foods. LLDPE is the primary resin in these applications, but metallocene grades of HDPE and PP, as well as new generations of thermoplastic elastomers and plastomers, also are making gains. Low density polyethylene typically cannot be produced using single-site catalysts, heightening its displacement by LLDPE and other resins. Faster metallocene and single-site polymer gains are expected for emerging applications in blow and injection molding, fibers and nonwovens, rotomolding and extrusion.

Study coverage

Details on these and other findings are available in the 195-page Freedonia industry study, *Metallocene & Single-Site Polymers*, available for $4100. The study provides historical US demand data (1994, 1999, 2004) and forecasts to 2009 and 2014 by metallocene and single-site polymer type (e.g., LLDPE, HDPE, polypropylene, EPDM, TPEs, plastomers); by application and by market. The study also considers market environment indicators, reviews technology, details industry structure, presents company market share data and profiles 24 leading industry competitors.
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(million pounds)

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Source: The Freedonia Group, Inc.

#1913 - “Metallocene & Single-Site Polymers”

TABLE IV-4
BLOW & INJECTION MOLDING APPLICATIONS FOR METALLOCENE & SINGLE-SITE POLYMERS
(million pounds)

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Source: The Freedonia Group, Inc.

METALLOCENE & SINGLE-SITE THERMOPLASTICS

Metallocene & Single-Site LLDPE

Demand for metallocene linear low density polyethylene (mLLDPE) is projected to rise 17 percent annually to three billion pounds in 2009, stimulated by the significant processing and performance advantages of these resins over thermoplastics, particularly LDPE. LLDPE is particularly well suited to metallocene catalyst technology, and this segment is by far the largest developed in the industry. In fact, with demand totaling 1.4 billion pounds in 2004, the market for mLLDPE was larger than the market for all other metallocene polymers combined (including plastics such as EPDM and TPOs, and miscellaneous plastomers). Advantages of metallocene LLDPE over conventional LDPE include improved tensile, puncture and impact resistance; improved optical improvements; improved optics with excellent clarity and gloss; and easy blending with other polyolefins.

LLDPE is mainly used in cast and blown film, particularly in packaging applications, though nonpackaging applications (such as diapers as well as agricultural and industrial uses) also are significant. LLDPE is produced in a low pressure process similar to that used to produce HDPE, with two dominant production technologies being Dow Chemical’s UNIPOL process and BP’s INNOVENE process. Both of these are gas phase processes; Dow’s proprietary PE technology is a solution process. In competition with both LDPE and HDPE, LLDPE’s primary advantages are its excellent puncture resistance and high tensile strength.

The primary advantage metallocene catalyst technology holds over conventional Ziegler/Natta processes in LLDPE production is one of versatility: metallocene processes allow an unprecedented degree of customization, facilitating the cost-effective production of polymers with enhanced performance qualities such as higher strength, improved clarity and better processability. In short, these catalysts offer the potential to tailor LLDPE to specific applications without the use of costly additives and compounding. However, the threat posed...
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