ABSTRACT
Process Economics Program Report 18C
POLYETHYLENE TEREPHTHALATE
(September 2006)

Development and growth in the polyethylene terephthalate (PET) solid-state resin market since 1999 have been strong. Since their introduction in the mid-1970, global demand for these resins has reached 10.5 million metric tons by 2004. The global demand for these resins has continued to grow at high single-digit rates.

In the last few years, significant technology improvements associated with PET production have occurred. The main goal of these improvements has been to drastically reduce the production cost of PET, maximizing profitability. Eastman Chemical has developed a new process to produce PET, and is now constructing a new 350,000 t/y PET plant in South Carolina (USA) for making PET based on this process. It is scheduled for completion in 2007, Eastman Chemical is also considering building a 700,000 t/y PET plant to on line by 2009. Typically PET production plants start from purified terephthalic acid as a raw material. Eastman Chemical's new process, called the IntegRex™ process, produces PET from an integrated plant starting with p-xylene. The integrated plant combines the production of polymer-grade terephthalic acid and PET. The IntegRex™ process incorporates recent process improvements to produce Eastman polymer-grade terephthalic acid (EPTA) and to produce PET. Eastman claims that the manufacturing cost of its new process is approximately 1/3 lower then conventional technology, and that the new process is fully capable of producing the higher quality solid state grades used in blow molded PET bottles.

The current report will evaluate PET production by Eastman Chemical's IntegRex™ process. The evaluation will be based on an integrated 450 kta production plant capable of producing bottle-grade PET resins starting from para-xylene to produce polymer-grade terephthalic acid. The economics for this process will be compared to a conventional process to produce PET solid-state resins. Other technologies including Zimmer's “Direct to Preform” and Uhde Inventa-Fischer’s “Melt to Resin” (MTR) process will be discussed.
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