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Abstract

The global butadiene market, with current annual production at about 11 million MT and valued at $30-40 billion, is slated to grow at 4.1% per year through 2016. Approximately two-thirds of the butadiene produced is used in synthetic rubber manufacturing. This growth is primarily based on increased demand via derivative expansion and rapid economic growth, particularly in Asia.

High crude oil prices and low natural gas prices in the U.S. have caused petrochemical companies to shift from oil-based naphtha cracking to natural gas-based ethane cracking, and have resulted in reduced butadiene supply. This has spurred interest in on-purpose butadiene production both from conventional feedstocks and renewable feedstocks.

Meanwhile, there has been great interest in green tires, which are manufactured from synthetic rubber derived from bio-based monomers such as bio-isoprene and bio-butadiene. Indeed, the bio-butadiene area is particularly active with companies including Genomatica and Cobalt Technologies announcing their plans to commercialize in the next five years.

IHS Chemical Process Economics Program (PEP) has reviewed the latest patents and selected open literature made available by the companies mentioned above. Comparative process design and economics are provided for the production of 220 million lb/yr (100,000 ton/yr) of bio-based 1,3-butadiene. These bio-processes will be compared to the dominant, conventional process for butadiene production to understand its feasibility. This report is of interest to biochemical companies, Asian chemical companies in expansion mode, global petrochemical companies seeking to reduce their environmental footprint and polymer/plastic/rubber industries that rely on butadiene as a raw material.
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