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Acrylonitrile Process Summary

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Abstract

As an important intermediate in the propylene value chain, Acrylonitrile is used in a wide variety of end uses, including polyacrylonitrile (fibers) and resins. It is also used along with styrene in the production of styrene-butadiene-acrylonitrile (SAN) elastomer, nitrile rubber, and acrylonitrile-butadiene-styrene (ABS) copolymer. Moreover, it is used to produce acrylamide and adiponitrile intermediates that are consumed in the production of nylon. On a global basis, acrylonitrile consumption is expected to grow at a moderate rate of about 3.2%.

In this PEP process summary, we review the current technologies for industrial production of acrylonitrile from propylene and propane. Almost all acrylonitrile is currently produced by ammoxidation of propylene. However, there is some promise in using propane as the feedstock due to its lower cost. The technologies presented here are based on previous PEP reports and reviews on this subject and are consolidated for a convenient overview. Moreover, a brief summary of supply and demand of acrylonitrile is presented, mostly on a global basis. Historical price movement in the product and the feedstock is presented along with a summary of underlying market drivers.

The production economics assessment in this report is based on US Gulf Coast location. However, an iPEP Navigator module is attached with this report to allow a quick conversion of snapshot process economics to three other major regions: Germany, Japan, and China. With the selection of each competing process, the module also allows production economics to be reported in English or Metric units in each region.

Moreover, due to the fluctuation and variation of feedstock and utility prices over time and in different regions, ranking of the processes by a snapshot comparison can be misleading. To overcome the deficiency of traditional snapshot economics comparison, this process summary also includes an iPEP Spectra interactive data module, by which our clients can quickly compare historical quarterly production economics from 2000 to second quarter 2015 of competing processes in major global regions. The interactive module, written as an Excel pivot table, is attached with the electronic version of this process summary. The module provides a powerful interactive tool to compare production economics at various levels, such as variable cost, cash cost, and full production cost. An iPEP Spectra module provides a more comprehensive way of assessing competing technologies, leading to a more valid investment decision.

While the processes are PEP's independent interpretation of the companies' patent literature and may not reflect in whole or in part the actual plant configuration, we do believe that they are sufficiently representative of the processes to estimate the plant economics within the range of accuracy for economic evaluations of the conceptual process designs.

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