



TECH 2020-3: Acrylonitrile

Acrylonitrile is one in a series of reports published as part of NexantECA's 2020 Technoeconomics – Energy & Chemicals (TECH) program.

Overview

Acrylonitrile is a petrochemical intermediate, traditionally used as a monomer or comonomer for synthetic fibers, as well as a constituent of certain important plastics and elastomer products.

The acrylonitrile technology base is highly consolidated, with few active licensors. INEOS is the predominant licensor for the propylene ammoxidation process route and its technology is reportedly used in more than 90 percent of acrylonitrile plants globally. There has been interest in developing a propane-based ammoxidation route due to the cheaper feedstock costs. Asahi Kasei possesses technology to produce acrylonitrile via propane ammoxidation and employs this technology at its PTTAC joint venture plant in Thailand, however, this is the only commercial plant globally that utilizes the propane ammoxidation process route.

This TECH report provides an overview of technological, economic, and market aspects of the acrylonitrile industry.

- How has the acrylonitrile technology landscape evolved over the past few decades? How does the propane ammoxidation route compare to the conventional propylene ammoxidation route?
- Is acrylonitrile technology available and who are the key technology owners and licensors? What are the differences between their offerings?
- How much does it cost to produce acrylonitrile and how are production costs impacted by sensitivity to propane and propylene prices for the propane ammoxidation and propylene ammoxidation routes, respectively?
- What developments have occurred over the past few years regarding bio-based acrylonitrile production and how far have these technologies advanced?
- What are the key end-uses and market drivers for acrylonitrile globally?

Commercial Technologies

The TECH report details differences between the propylene ammoxidation and propane ammoxidation

technology routes and also contains an analysis of major technology holders and/or licensors of acrylonitrile technology: INEOS, Sinopec, and Asahi Kasei.

Process Economics

The acrylonitrile costs of production for the conventional propylene ammoxidation route and the propane ammoxidation route for plants located in the United States, Western Europe, Middle East, Southeast Asia, and China have been estimated for the second quarter of 2020. A historical analysis of propylene ammoxidation and propane ammoxidation costs for the United States has been estimated to demonstrate the relative competitiveness of the two routes and their sensitivity to feedstock pricing.

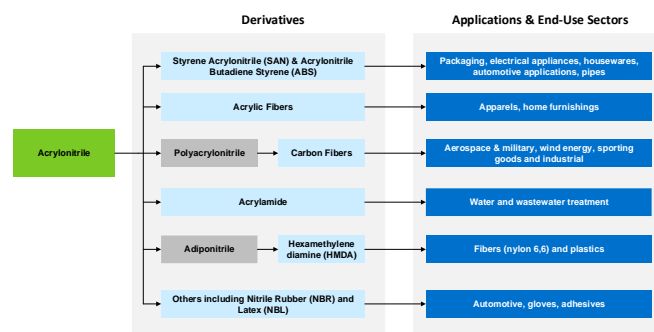
Commercial Overview

Acrylonitrile is primarily used in the production of Styrene Acrylonitrile (SAN) and Acrylonitrile Butadiene Styrene (ABS), which are thermoplastics used in a variety of applications including packaging, appliances, housewares, vehicles, and pipes. Acrylonitrile is also used extensively in the production of synthetic fibers, including acrylic fibers, modacrylic fibers, carbon fibers, and adiponitrile, a nylon intermediate.

During 2020, acrylonitrile consumption declined sharply and experienced negative growth in most regions as a result of the ongoing COVID-19 pandemic. A gradual recovery in the second half of the year has limited contraction globally to a single digit decline over the full year.

This TECH report includes supply, demand, and trade balances for acrylonitrile on a global and regional basis, with forecasts to 2025.

Acrylonitrile Value Chain



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Technology and Costs comprises the Technoeconomics – Energy & Chemicals (TECH) program, the Biorenewable Insights program (BI), and the new Cost Curve Analysis. These programs provide comparative economics of different process routes and technologies in various geographic regions.

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