NexantECA

Technology and Costs

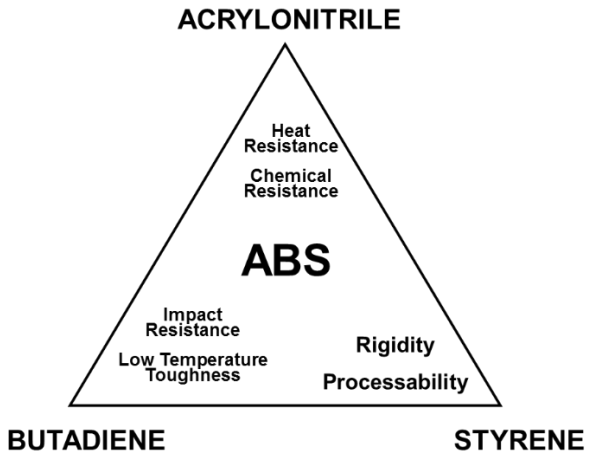
TECH 2020-8: ABS/SAN Resins

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

Overview

ABS is produced by the emulsion, suspension, mass (or bulk), or emulsion/mass hybrid polymerization of three monomers: acrylonitrile, butadiene, and styrene. The emulsion/mass hybrid is by far the most widely used process commercially. Material properties may be varied by adjusting the concentrations of the constituents, the degree to which the butadiene grafts to the styrene acrylonitrile portion, or by adding an additional monomer. ABS polymers are tough and thermally resistant. The butadiene contributes toughness and low temperature impact strength, whereas acrylonitrile improves thermal stability and chemical resistance while the styrene contributes rigidity.

Role of the Different Monomers in ABS Properties



ABS production technology can be characterized as very mature, with the production processes well known and widely practiced by many different producers. Process improvements in the ABS industry are focused on modest operational improvements, such as increasing throughputs, decreasing raw material and energy losses, and improving product properties, notably color; the vast majority of these are expected to be incremental in nature.

Commercial Technologies

By far the most widely used ABS production technology is the emulsion/mass hybrid route, where high graft rubber ABS is produced via emulsion and SAN is produced via a mass process and then the two are mixed together. The mass process to make ABS has a number of advantages over the hybrid process but produces ABS with a matte or dull finish which is not favored in the marketplace. Finally, ABS can be produced by a traditional compounding operation based on purchased raw materials.

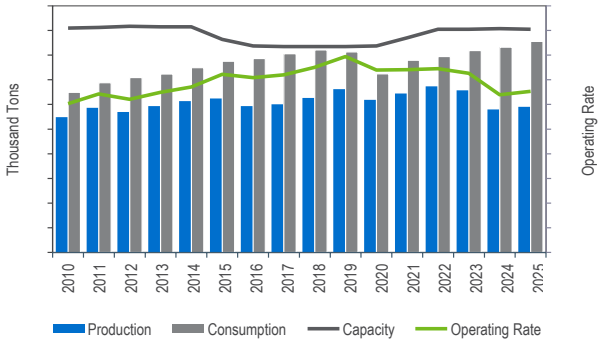
Process Economics

For this report, NexantECA evaluated the two main processes available for ABS production – the mass and hybrid processes. In addition, the production of ABS via compounding of a high graft rubber content ABS and SAN is also profiled. The evaluation provides:

- Process description with simplified flow sheets
- Recent developments related to process technology
- Investment and cost of production (COP) estimates for a grassroots facility
- Estimates are made for plants located in the USGC, Western Europe and Coastal China

Commercial Overview

Key end-use markets, applications and market trends are developed for ABS for the regions – North America, Western Europe, Asia Pacific, and Rest of World. Demand and supply/demand balances are provided for 2010-2025.



A list of global producers is also provided.

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- Chemistry
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- Regional supply and demand balances for product, including capacity tables of plants in each region
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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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