



TECH 2019-4: Xylenes

Xylenes is one in a series of reports published as part of Nexant’s 2019 Technoeconomics – Energy & Chemicals (TECH) program.

Overview

The xylene isomers, *meta*-xylene, *ortho*-xylene, and in particular *para*-xylene, are important chemical intermediates. *para*-Xylene has by far the largest market of the three isomers, with the largest use of *para*-xylene being its oxidation to make purified terephthalic acid (PTA), a raw material for polyester fiber and polyethylene terephthalate resin (PET).

In 2019, the *para*-xylene market is experiencing huge disruptions with the commissioning of new integrated aromatics facilities in China. These new complexes represent a step change in world scale plant capacity, and will boost global *para*-xylene capacity. This capacity expansion is being driven by the growing polyester market, and by back integration by the major Chinese polyester producers from PET for fiber and bottle production to PTA to *para*-xylene and ultimately to crude oil. The *para*-xylene market has experienced unprecedented growth since 2017, due to the strong polyester sector and China’s ban on plastic scrap imports in 2018, increasing demand for virgin PET and *para*-xylene.

This TECH report provides an updated overview of the technological, economic, and market aspects for xylenes. The following issues are addressed in this report:

- What are the major technologies for xylenes production and how do they differ? Which technologies are available for license?
- How do the process economics compare across processes and different geographic regions?
- What is the current market environment for *para*-xylene? How does its growth compare in different regions?

Commercial Technologies

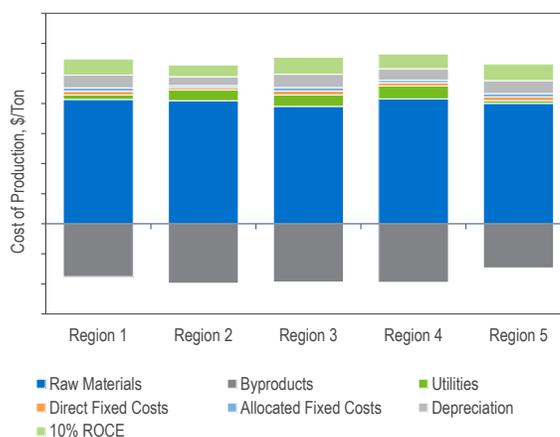
Xylenes are produced as co-products in refinery catalytic reformers, olefins plants, and toluene disproportionation (TDP) units. Mixed xylenes are extracted from reformat or pyrolysis gasoline in an aromatics complex by fractionation. Additional xylenes can be produced in an aromatics complex by toluene disproportionation to xylenes and benzene. *para*-Xylene is recovered from mixed xylenes via selective adsorption or crystallization.

Technologies developed by UOP, Axens, ExxonMobil, BP, and GTC Technology are described and analyzed, with a focus on recent developments.

Process Economics

Detailed cost of production estimates for various technologies are presented for the USGC, coastal China, Western Europe, Southeast Asia, and Middle East locations. Estimates are developed for an integrated aromatics complex and for individual processes.

Regional Cost of Production Comparison for an Integrated Aromatics Complex



Commercial Overview

In 2018, global *para*-xylene consumption was 47.2 million tons, around 98 percent of which was consumed in the production of purified terephthalic acid (PTA). PTA is the principal feedstock for PET (polyester) resin and fibers production. With new global capacity, demand growth of 4.1 percent per year through 2024 is expected. An overview of the supply, demand, and trade of *para*-xylene on a global and regional (North America, Western Europe, and Asia Pacific) basis is provided in this TECH report.



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- Chemistry
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- Process economics – comparative costs of production estimates for different technologies across various geographic regions
- Overview of product applications and markets for new as well as established products
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Technology and Costs comprises the Technoeconomics – Energy & Chemicals (TECH) program (formerly known as PERP), the Biorenewable Insights program (BI), the Sector Technology Analysis, 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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