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Catalysts for Reforming Naphtha to Hydrocarbons

PEP Report 153G

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Abstract

This report presents process designs and economics for production of a semi-regenerative (SR) naphtha reforming catalyst, a continuous catalytic regeneration (CCR) naphtha reforming catalyst, and a widely used support material. Recent developments, background technologies, and catalyst synthesis chemistry are discussed in relation to process design.

Naphtha is the key source of both high-octane gasoline and aromatic chemicals. Well over half of all naphtha ultimately goes into gasoline. Production of aromatic chemicals currently accounts for almost a quarter of naphtha consumption and is rising, as part of a general trend in crude oil to chemicals production. Heavy cuts are used in catalytic reforming, and the projected annual growth in reforming catalyst consumption is almost twice that for consumption of heavy naphtha itself.

Changing market dynamics can present challenges to catalyst manufacturing. Although over one-third of catalyst demand is for SR catalyst, a 10+ year trend of increasing demand for CCR catalyst and declining demand for SR catalyst is expected to continue. Manufacturers provide both types of catalyst and a full range of services. The design and process economics in this report are therefore evaluated for both standalone plants and plants campaigned to produce both types of catalyst, optionally also producing a third product for increased utilization of capital.

The report also provides overviews of the naphtha reforming catalyst industry and reforming technologies. Products offered by catalyst suppliers are noted, and patent portfolios on catalysts and associated process innovations from industry leaders are reviewed over the past 10 years.

The Naphtha Reforming Catalysts interactive iPEP module is included, enabling the user to compare economics for the different processes in multiple geographic regions.

While the processes presented herein represent the IHS Markit Process Economic Program's (PEP's) independent interpretation of the literature, and may not reflect in whole or in part the actual catalyst formulations and plant configurations, PEP believes the conceptual designs are sufficiently representative of materials and plant configurations used to enable Class III economic evaluations.

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