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Well Resources Ionikylation Process

PEP Review 2019-13

December 2019

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Abstract

In the refinery context, alkylation refers to the reaction of light olefins, ideally butylenes, with isobutane to produce isooctane isomers. Alkylate has emerged as an ideal gasoline blending component due to the combination of high-octane value, absence of olefins or aromatics, low sulfur content, and low Reid vapor pressure (RVP). However, the challenges to alkylation are related to its production processes. The currently prevalent manufacturing processes use strong liquid acids such as hydrofluoric acid or concentrated sulfuric acid as catalysts. These are highly hazardous and corrosive chemicals with the potential of catastrophic hazards and liability for the operator in the case of an accidental release. Consequently, there is an increasing interest in developing and commercializing new technologies that eliminate this substantial operational risk. In this context, alkylation processes that use ionic liquids as catalysts have been recently developed and commercialized, eliminating hazards and risks associated with strong liquid acids.

In this review, we present technoeconomic analysis of the Ionikylation™ composite ionic liquid-based alkylation process, licensed by Well Resources, Inc. The processing capacity is 450,000 MTPY (~992 million lb/year) of alkylate production. This corresponds to approximately 12,500 b/d of alkylate.

The production economics assessment in this report is based on a US Gulf Coast (USGC) location. However, an iPEP Navigator module (an excel-based computer costing model developed by IHS Markit) is attached with this report to allow a quick calculation of the process economics for three other major regions as well—Germany, Japan, and China. For every process, the module also allows production economics to be reported in English or metric units in each region.

The technological and economic assessment of the processes is PEP's independent interpretation of the companies' commercial processes based on information presented in open literature, such as patents or technical articles, and may not reflect in whole or in part the actual plant configuration. We do believe that they are sufficiently representative of the processes and process economics within the range of accuracy necessary for economic evaluations of the conceptual process designs.

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