`

IHS Markit™

Acetic Acid by Chiyoda CT-ACETICA™ Process

PEP Review 2018-01

January 2018

Marianne Asaro
Director of Chemistry and Catalysis

Pete Pavlechko
Principal Analyst

2018-01 | Process Economics Program

PEP Review 2018-01

Acetic Acid by Chiyoda CT-ACETICA™ Process

Marianne Asaro, Director of Chemistry and Catalysis
Pete Pavlechko, Principal Analyst

Abstract

Acetic acid is a moderate-volume commodity chemical, with global annual production of approximately 20 million metric tons that is forecasted to show a moderate increase over the next few years. Acetic acid is used in production of vinyl acetate, terephthalic acid, acetic anhydride, ethyl acetate, and butyl acetate, as well as in various small-volume applications including production of metal acetates, cellulose acetate, vinegar, and medicine.

Methanol carbonylation dominates the current era of acetic acid production, specifically the low-water carbonylation technologies using homogeneous catalysis as developed by BP and Celanese. Celanese is the main producer in the Americas, and BP in Europe. In Asia, Celanese technology is used in China and Singapore, and BP's process is used in Korea, Malaysia, and Taiwan.

Commercial carbonylation of methanol has followed a path of homogeneous catalyst development over the years, from the BASF "high-pressure" process based on an iodide-promoted cobalt catalyst, to the Monsanto "low-pressure" improvement using a homogeneous methyl iodide–promoted rhodium catalyst, to the improved "low-water" versions of Celanese and BP that decreased the cost of downstream separations. To further simplify separations and catalyst operations, Chiyoda developed a process using a heterogeneous, supported form of the catalyst. Chiyoda also demonstrated a commercial version of the supported rhodium catalyst system, named the CT-ACETICA™ process, which is the subject of this review. The CT-ACETICA™ process is now available for licensing by KBR and Chiyoda.

This review evaluates the methanol carbonylation technology patented by Chiyoda, the industry status, and the design basis and economics for the CT-ACETICA™ process at world scale. An interactive module is included, the iPEP Navigator CT-ACETICA™ tool, that provides a snapshot of economics for the process and allows the user to select the units and global region of interest.

While the process presented herein represents the IHS Markit Chemical Process Economic Program (PEP) independent interpretation of Chiyoda's literature and may not reflect in whole or in part the actual plant configuration, we do believe it to be sufficiently representative of the plant conceptual process design to enable economic evaluation.

Contents

Tables

Figures

IHS Markit Customer Care:

CustomerCare@ihsmarkit.com
Americas: +1 800 IHS CARE (+1 800 447 2273)
Europe, Middle East, and Africa: +44 (0) 1344 328 300
Asia and the Pacific Rim: +604 291 3600