

PERP Program

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Chem Systems' Process Evaluation/Research Planning program has published a new report, ***Vinyl Acetate (00/01-3)***.

Vinyl acetate monomer (VAM) is a highly versatile and important intermediate used in the production of a variety of polymers (e.g. polyvinyl acetate, polyvinyl alcohol, polyvinyl butyral, and polyvinyl formal) that are used in many industrial and consumer products.

About 40 percent of VAM production is currently controlled by two major players in the industry, Celanese (27 percent) and Dow (13 percent). There are, however, many producers with smaller capacities. Regardless of the individual producer's capacity, approximately 80 percent of these production plants have been in operation for more than 20 years and some continue to use old process technology that utilizes acetylene feedstock, not ethylene.

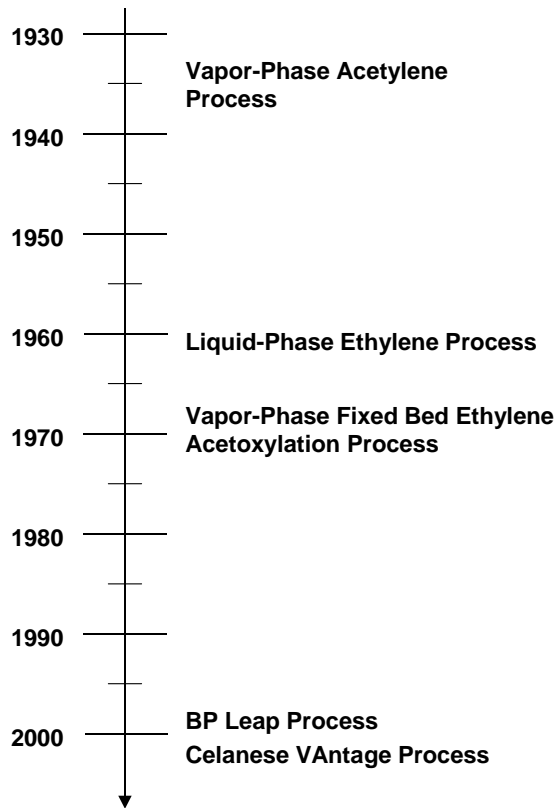
Due to inherent technological characteristics, the current VAM manufacturing process has some limitations on operating costs and expansion capability. Considering the relative old age and technology of most plants, any technological innovation, which allows for improvements in operating costs, reliability, and expansion capability would provide an important competitive advantage.

The commercial vinyl acetate (VAM) manufacturing process has gone through several stages of revolutionary and evolutionary changes. The time line of commercial VAM process development is shown on the following page.

The industrial manufacturing of VAM was first developed by Wacker via the vapor phase reaction of acetic acid and acetylene during the early 1930s. Virtually all VAM was produced by this technology until the early 1960s when the advent of selective transition metal oxidation catalysts enabled the replacement of acetylene by ethylene as the feedstock. The ethylene based routes to VAM production moved to the forefront because of the lower raw material cost, which translated into lower cost product.

In the early 1960s several liquid phase ethylene based production processes were developed and commercialized. Unfortunately, all of the liquid phase VAM plants were shut down between the late 1960s and the early 1970s due primarily to the unexpected corrosion problems that necessitated expensive equipment modifications.

TIMELINE OF COMMERCIAL VAM PROCESS DEVELOPMENT



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The chemistry of vapor phase ethylene acetoxylation to vinyl acetate was discovered around 1960. In less than a decade, fixed bed, vapor phase ethylene acetoxylation VAM manufacturing became the process of choice.

BP and Celanese, respectively, announced their new proprietary VAM processes, the Leap Process in late 1998 and the VAntage Process in mid 2001, to further improve the ethylene acetoxylation process.

In this report, both the acetylene-based and the conventional ethylene-based commercial VAM technologies are reviewed. Cost reductions offered by the Leap Process and the VAntage Process are also analyzed.