

Abstract
Process Economics Program Report 111A
METHANOL-BASED CHEMICALS
(July 2002)

Global demand for methanol, which grew at an annualized rate of 4.3% in 1996-2001, is expected to slow to an annual growth rate of 2.1% through 2006. A key factor depressing the projected demand for methanol is the current political controversy over one of its largest derivative markets—methyl tertiary-butyl ether (MTBE), an additive in reformulated gasoline. On the other hand, recent advances in methanol plant production technology coupled with mega-plant economies of scale may greatly reduce methanol production costs, especially in regions with currently underutilized low cost hydrocarbon feedstocks, such as “stranded” natural gas or petroleum refinery residues. Once this low-cost methanol becomes available in quantity and a marketing infrastructure becomes operative, a number of new markets for methanol may emerge.

In this report, we have evaluated one of the most promising new applications for methanol: the conversion of methanol to light olefins. We have developed conceptual designs and economics of the two processes currently available for license—the UOP/Hydro MTO (methanol-to-olefins) technology based on a modified SAPO-34 catalyst, and Lurgi’s MTP (methanol-to-propylene) process based on a modified ZSM-5 catalyst. Our analysis shows that both processes have product values that are competitive with those of conventional technologies when methanol is priced below 30¢/gal.

This report also presents comparative evaluations of several processes for producing formaldehyde and acetic acid, which are two commercially important derivatives of methanol. Our conceptual design and economic analysis of the recent Topsøe SR (Series Reactor) formaldehyde process indicate that the technology offers economic advantages over the conventional metal oxide-catalyzed process.

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