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Abstract

Ammonia is one of the most important chemicals used for the production of a variety of industrial products. It is used extensively for manufacturing fertilizers, drugs, vitamins, explosive, cosmetics, plastic materials, fibers, etc. Ammonia is also a very good refrigerant, and is used for food preservation and beverage production as well as cold storage facilities. In spite of its numerous uses, the major consumer of ammonia is urea, a nitrogenous fertilizer. More than 80 percent of the ammonia is used for making urea worldwide. Increasing ammonia demand by the nitrogenous fertilizers industry is projected to drive the global ammonia market over the next decade.

Ammonia is synthesized by using nitrogen and hydrogen gases. For this purpose, the nitrogen is obtained through the air, while the hydrogen is produced (as a constituent of syngas) mainly by steam-methane autothermal reforming or by partial oxidation processes from natural gas or coal. Natural gas is the primary feedstock for ammonia and syngas production in most of the regions of the world. In China, coal is gasified with oxygen and steam to produce the syngas, which serves as the source for hydrogen production. Although the–technology for ammonia production is quite developed, energy efficiency and lower production cost are still major challenges facing the industries.

Several research papers, scientific reviews, technical reports, and patents have been published by academicians, industry researchers, and technology licensors for the ammonia production process. The IHS Chemical Process Economics Program (PEP) has published the technoeconomic analyses of different ammonia technologies periodically and has reported the results in numerous reports—namely, PEP Review 2016-14, *Ammonia Production by Haldor Topsøe Conventional Technology* (December 2016), PEP Report 44B, *Advances in Ammonia Technology* (November 2009), PEP Report 44A, *Ammonia* (July 1980), and PEP Report 44, *Ammonia* (November 1968).

The present review is the latest PEP publication on the subject of ammonia production. This review focuses on the technoeconomic assessment of the ammonia production process, depicting the most advanced and the latest schematic representation of the Haldor Topsøe process for ammonia production. An interactive iPEP Navigator costing module is also presented with the electronic version of this review, which provides a snapshot of the economics of other ammonia processes; the module also allows the user to select the process, units, and region of interest according to individual costing needs.

This review will be of particular interest to those looking for information on ammonia technologies and their respective economics. The readers can be associated with syngas and ammonia production.

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