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# Innovative and environmental-benign process for the production of propylene oxide (PO)

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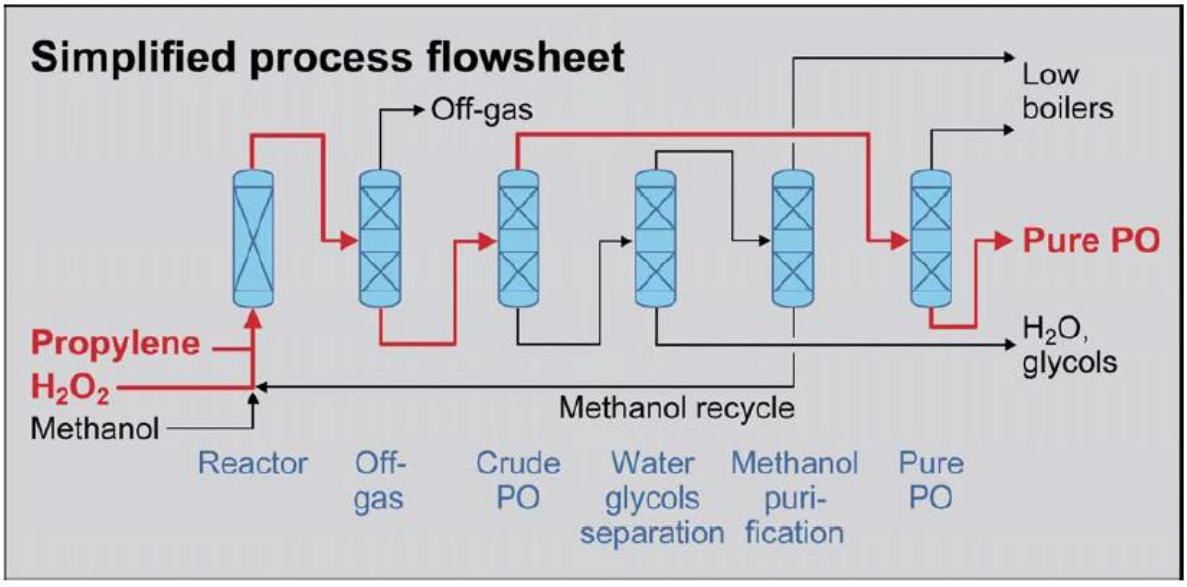
Propylene oxide (PO) is a widely used chemical intermediate, with a world capacity in 2017 of nearly 11 million m.t./yr. PO is used in wide range of industrial and commercial products, including polyurethanes, propylene glycols and glycol ethers.
Traditionally, four commercial-scale PO processes have been used globally, the chlorohydrin (CHPO) route and three hydroperoxidation processes: propylene oxide/tertiary butyl alcohol (PO/TBA), styrene monomer/propylene oxide (SMPO) and cumene hydroperoxide (CPO).
In the HPPO process developed by The Dow Chemical Co. (Midland, Mich.) and BASF SE (Ludwigshafen, Germany), hydrogen peroxide — a clean, versatile, environmentally benign oxidant substitutes chlorinated oxidants or organic peroxides. The reaction of $H_2O_2$ with propylene produces only water as a co-product, and minor amounts of PO derivatives, such as propylene glycol.
Compared with existing PO technology, this HPPO process reduces wastewater by 70–80%; reduces energy usage by 35%; and reduces infrastructure and physical footprint with simpler raw material integration and avoidance of co-products. New PO plants using HPPO technology require up to 25% less capital to build.
The first plant based on HPPO technology started up 2008 in Antwerp, Belgium (300 kta), followed 2011 by Map Ta Phut, Thailand (390 kta) and 2017 in Al Jubail, Saudi Arabia.



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Born 1960. Doctorate in Technical Chemistry and Senior Global Technology Manager with Dow Chemical since 1989 working in various assignments on the development and implementation of alternative technologies to produce Propylene Oxide (PO), a versatile commodity used broadly in the chemical industry. Co-inventor with BASF researchers of the HPPO (hydrogen peroxide based PO) route, recognized with the 2009 IChemE Award and 2010 US Presidential Green Chemistry Award from lab and pilot plant scale to industrial implementation in Antwerp (Belgium), Map Ta Phut (Thailand) and Al Jubail (Saudi Arabia).