245a New Applications of Organic Solvent Nanofiltration and Pervaporation in Chemical and Refining Processes (Invited Keynote Speaker)

Lloyd S. White

New membrane, modules, and systems are under development for large-scale organic/organic separations. Practical applications of these membrane processes can be envisioned in the refining, chemical, pharmaceutical, and polymer industries.

An example of large-scale organic solvent nanofiltration is the MAX-DEWAX™ process for solvent recovery in lube dewaxing. This has been in operation at the ExxonMobil Beaumont Refinery since 1998 at a feed rate of 36,000 barrels per day (5,800 m3/day). More recently, S-Brane™, a pervaporation process that selectively removes sulfur-containing molecules from FCC and other naphtha streams, is under commercial implementation. A demonstration plant for S-Brane was run on-stream at an East Coast refinery using FCC naphthas. S-Brane technology reduces the overall capital and operating cost for clean fuel compliance, and also provides a means for preserving octane that often occurs in hydrotreating-based technology.

Experimentally it can be shown that high-pressure nanofiltration and low-pressure pervaporation are governed by the same basic principles found in solution-diffusion models. Choice of membrane operating systems is dependent on the composition of the feed stream and the required product quality. Further examples of these systems come from aromatics/non-aromatics separations found in hydrocarbon processing. These processes can be used to selectively control benzene, toluene, and other aromatics found in feed streams.