Advanced, Cost Effective Propylene Separation Technology

Propylene/propane separation is one of the most important, challenging and energy-intensive processes in petrochemical industry. The separation is traditionally performed by a highly energy-intensive, and therefore expensive, distillation process. There exists a need for less expensive separation techniques.

Description of the Invention

A new nanocomposite membrane shows excellent propylene/propane separation consists of propylene-selective coordination compounds uniquely embedded inside a mesoporous oxide matrix. The mesopores of the matrix are deposited with zinc oxide (ZnO) via atomic layer deposition technique (ALD), and the pores are plugged with a zeolitic imidazolate framework (ZIF) created by an expansive, reactive transformation of deposited zinc oxide to a zinc-imidazolate coordination compound. This first-of-its-kind nanocomposite membrane offers enhanced propylene separation performance and membrane stability, and at a lower cost than previous technology.

Features and Benefits

• Novel nanocomposite membrane
• Improved membrane stability (mechanical and thermal)
• Enhanced separation performance
• Easy, reproducible fabrication method
• Scalable
• Technoeconomic analysis available
• Cost effective

Potential Applications

• Propylene/propane separation
• Gas separation
• Separation membranes
• Chemical/petrochemical industry
• Propylene recovery (polypropylene plant)