



High Permeance Separation Membrane Support for Operation under High Pressure Conditions (20140165, Dr. Michael Tsapatsis)

IP Status: Issued US Patent; **Application #:** 14/327,720

Silica Support for Zeolite Membrane

A new method produces a high permeance silica (quartz) based support for membranes. The high permeance silica fiber support features superior mechanical strength and is the only silica support with the potential to withstand industrial operating conditions. The silica supports also exhibit low stress in the membrane during thermal treatment and epitaxial growth of zeolite film on silica supports.

Technology ID

20140165

Category

Engineering & Physical
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Sciences/Sustainable Technology

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High Flux Silica Support

Using high flux, thin zeolite membranes and high flux membrane supports could lower costs of industrial processes, compared to most current membrane supports comprised of alumina or Stober silica spheres lack the mechanical properties necessary for industrial applications. This new silica fiber technology addresses both the permeance and strength issues associated with alumina and Stober silica supports. The silica fiber membrane exhibits exceptionally high permeance (higher than current state-of-art zeolite membranes for separation of xylenes) and is mechanically stronger because it can be sintered at much higher temperatures. In addition, the silica fiber manufacturing process is both easier and less expensive than Stober silica.

BENEFITS AND FEATURES:

- Silica support could potentially withstand industrial operating conditions (i.e., pressure up to 50 bar)
- Increased permeance: 10x higher permeance than Stober silica based supports
- Withstands higher temperatures; less sensitive to sintering temperature fluctuation
- Less expensive manufacturing process

APPLICATIONS:

- Potential for industrial applications (e.g., product separation, chemical synthesis and pollution abatement)
- Chemical/petroleum separation equipment
- Molecular Sieving
- Chemical sensors
- Catalysis

Phase of Development - Lab Scale

Researchers

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