Microporous membranes for the separation of enantiomers

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BRIEF DESCRIPTION

Current methods used to separate racemic compounds on a large scale have limitations in cost, energy efficiency, and discontinuous processing. UCI researchers have synthesized a membrane made of chiral porous polymers that can separate enantiomers from racemic mixtures through continuous processing.

TECHNOLOGY DESCRIPTION

Enantioselectivity reduces off target effects and increases effectiveness of pharmaceuticals drugs and industrial compounds such as agrochemicals, flavors and fragrances. However, the methods currently available to separate enantiomers are ill-suited to large scale processing, being expensive, prone to reduced activity over time, or utilizing inefficient, discontinuous processing.

Researchers at UCI have synthesized a membrane constructed from an intrinsically porous chiral polymer that separates enantiomers of chiral compounds. Production of the membrane (2cm wide and ~300 μm thick) from its polymer is a simple one day process. The large internal surface area allows optimal interaction with volumes being transported and allows for effective continuous separation. Additionally, the process does not require expensive reagents and consumes low energy. The researchers have demonstrated enantiomeric separation of the chiral polymer's starting materials using their own membrane, thereby demonstrating utility and reduced costs in the future mass production.

SUGGESTED USES

● Large scale and continuous process for enantiomer enrichment of industrial or pharmaceutical compounds

FEATURES/BENEFITS

●The chiral polymers used to make the membrane can be easily synthesized at high yields and dried into a thin membrane

●The filtration process can be continuous and yields high enantiomer enrichment after initial transport

● Efficient sample preparation with no high cost reagents required

STATE OF DEVELOPMENT

Experimental stage

Chiral polymers of intrinsic porosity have been synthesized and tested for enantiomeric selectivity using four racemic mixtures including the starting material 5,5',6,6'-tetrahydroxy-3,3,3',3'-tetramethyl spirobisindane (TTSBI) used to create the membranes.

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OTHER INFORMATION

CATEGORIZED AS

- **Materials & Chemicals**
  - Polymers
  - Thin Films
- **Medical**
  - Devices
  - Therapeutics

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2019-380-0

Future plans include modifying membrane polymer to allow the separation of enantiomers in organic solvents; and extending application for viral filtration.

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