US008048198B2

(12) **United States Patent**
Liu et al.

(10) **Patent No.: US 8,048,198 B2**
(45) **Date of Patent: Nov. 1, 2011**

(54) **HIGH PERFORMANCE MIXED MATRIX MEMBRANES INCORPORATING AT LEAST TWO KINDS OF MOLECULAR SIEVES**

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(*) Notice: Subject to any disclaimer, the term of this patent is extended or adjusted under 35 U.S.C. 154(b) by 517 days.

(21) Appl. No.: **11/936,951**

(22) Filed: **Nov. 8, 2007**

(65) **Prior Publication Data**

US 2009/0120875 A1 May 14, 2009

(51) **Int. Cl.**

B01D 53/22	(2006.01)
B01D 61/00	(2006.01)
B01D 71/02	(2006.01)
B01D 71/06	(2006.01)

(52) **U.S. Cl.** **95/45**; 95/47; 95/50; 95/51; 95/54; 95/55; 96/4; 96/8; 96/9; 96/10; 96/11; 96/12; 96/14; 210/640; 210/641; 210/500.27; 210/502.1; 502/4; 502/64

(58) **Field of Classification Search** 96/4, 7, 96/8, 9, 10, 11, 12, 14; 95/45, 47, 50, 51, 95/54, 55; 210/640, 641, 650, 500.27, 502.1, 210/506; 502/4, 64

See application file for complete search history.

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(57) **ABSTRACT**

The present invention discloses a new type of high performance mixed matrix membranes (MMMs) and methods for making and using the same. The MMMs comprise a continuous polymer matrix and at least two types of molecular sieves dispersed therein. The continuous polymer matrix in the MMM contains at least one type of polymer. The MMM in the form of a dense film, asymmetric flat sheet membrane or otherwise prepared exhibits simultaneously improved selectivity and permeability for gas separations compared to polymer membranes made from a continuous polymer matrix without any molecular sieves or with only one type of molecular sieve. MMMs of the present invention are suitable for a wide range of gas, vapor, and liquid separations such as alcohol/water, CO_2/CH_4, H_2/CH_4, O_2/N_2, CO_2/N_2, olefin/paraffin, iso/normal paraffins, and other light gases separations.

19 Claims, No Drawings