

Desalination and Water Treatment

www.deswater.com

1944-3994/1944-3986 $^{\odot}$ 2011 Desalination Publications. All rights reserved doi: 10/5004/dwt.2011.2859

Mixed matrix membranes based on hyperbranched polyimide and mesoporous silica for gas separation

Petr Sysel^{a,*}, Evgenia Minko^a, Michal Hauf^a, Karel Friess^b, Vladimir Hynek^b, Ondrej Vopicka^b, Krystof Pilnacek^b, Milan Sipek^b

^aDepartment of Polymers, Institute of Chemical Technology, Technicka 5, 166 28 Prague 6, Czech Republic Tel. +420 22044 3196; Fax: +420 22044 3175; email: Petr.Sysel@vscht.cz ^bDepartment of Physical Chemistry, Institute of Chemical Technology, Technicka 5, 166 28 Prague 6, Czech Republic

Received 3 September 2010; Accepted 3 January 2011

ABSTRACT

The novel mixed matrix membranes were prepared from the hyperbranched polyimide based on 4/4',4"-triaminotriphenylmethane and mesoporous silica MCM-41 (up to 16 wt.%). The permeability coefficients of hydrogen, carbon dioxide, oxygen, nitrogen and methane in the membranes increased and oxygen/nitrogen or carbon dioxide/methane selectivities decreased slightly with the silica content. The absolute values of permeability coefficients were fairly influenced by the method of additive incorporation to the polymeric matrix.

Keywords: Gas permeation; Mixed matrix membrane; Hyperbranched polyimide; Mesoporous silica; 4,4',4''-triaminotriphenylmethane; Oxygen/nitrogen selectivity

34 (2011) 211–215 October

^{*}Corresponding author.

Presented at the AMS6/IMSTEC10, The 6th conference of the Aseanian Membrane Society in conjunction with the 7th International Membrane Science and Technology Conference, Sydney Australia, November 22–26, 2010