ELSEVIER

Colloids and Surfaces
A: Physicochemical and Engineering Aspects 193 (2001) 61–70

COLLOIDS AND SURFACES A

www.elsevier.com/locate/colsurfa

Membrane liquid loss of supported liquid membrane based on *n*-decanol

B. Zhang, G. Gozzelino *, G. Baldi

Dipartimento di Scienza dei Materiali e Ingegneria Chimica, Politecnico di Torino, C.so Duca degli Abruzzi 24, 10129 Torino, Italy

Received 12 June 2000; accepted 5 March 2001

Abstract

It is well known that the stability of a supported liquid membrane (SLM) is affected by many factors, such as the supporting material, pore size, operating parameters, etc. The instability of SLM with *n*-decanol as organic phase is quantitatively studied in this paper by measuring the membrane liquid (ML) loss from the supporting membranes. It has been observed that the ML loss of different membranes is somehow related to their swelling. The swelling of supporting membranes based on cellulose acetate, mixed cellulose esters and PVDF appears to be non-isotropic. The ML loss dependence on running time and on solution flux is reported here. It was observed that the solution concentration and the concentration gradient through the membrane influence the ML loss. The effects of the membrane preparation, cell type and flow pattern were also investigated. SLM lifetime experiments have shown that the residual quantity of ML at the critical point of pore breaking, with different supporting membranes, are rather different. The lifetime of SLMs depends not only on the ability of the supporting membrane to retain the ML, but also on their ability to delay the formation of water channels.

Keywords: *n*-Decanol; Supported liquid membrane; Stability; Membrane liquid loss; Life time

1. Introduction

In recent years, research on liquid membranes has made great progress. However, the application of liquid membranes on a large scale is still limited due to the insufficient membrane stability. Evidence of instability are the solute flux decline with time, due to the loss of the solvent or/and carrier [1], and the leakage of the solutions, due to the formation of water channels between feed and strip phases [2]. Some suggestions have been reported, such as the modification of support materials, especially on the surface [3–5] or gelation of the membrane liquid [6], with the aim of improving the stability and allowing the supported liquid membrane (SLM) to work for a longer period. In order to extend the life-time of SLMs and make them suitable for industrial applications, it is of considerable interest to identify all the factors that influence their stability. These factors have been investigated by many researchers. According to

* Corresponding author. Tel.: +39-11-5644652; fax: +39-11-5644699.
E-mail address: gozzelin@fenice.polito.it (G. Gozzelino).

0927-7757/01/$ - see front matter
PII: S0927-7757(01)00688-4