Desalination and Water Treatment
www.deswater.com
4 (2009) 281–286
April
1944-3994 / 1944-3986
doi: 10.5004/dwt.2009.495

Impact of water state in membranes on the purification of copper-containing aqueous solutions by complexation–ultrafiltration

V.V. Goncharuk, A.P. Kryvoruchko*, I.D. Atamanenko, L.Yu. Yurlova

Institute of Colloid Chemistry and Water Chemistry, National Academy of Science of Ukraine, blvd. Vernadskogo, 42, Kyiv, 03680, Ukraine
email: kryvoruchko@ukr.net; atamanenko@ukr.net; yurlovs@ukr.net; honch@iccwc.kiev.ua

Received 25 December 2007; Accepted 5 April 2009

ABSTRACT

This paper deals with the investigation of ultrafiltration membranes of different chemical natures: polysulfone, polysulfoneamide, and polyamide ones produced by Vladipor (Russia) and Osmonics (USA). Coefficients of Cu(II) retention by membranes under investigation and transmembrane fluxes were determined in the process of ultrafiltration treatment of water containing Cu(II) and polyethyleneimine. The water state and quantity in membranes were also determined by the method of differential scanning calorimetry. The relationship of the transmembrane Cu(II) transfer and membrane total moisture content, amount of free and bound water in the membranes under investigation was established. Based on the data obtained by the DSC method and membrane total moisture content values, an assumption was made on the possibility of forming on the surface of the membranes a layer of Cu(II)–PEI complexes and partial overlapping by them at the mouths of membrane pores or penetration of these complexes into the pores of the membranes.

Keywords: Complexation; Differential scanning calorimetry; Ultrafiltration process; Water state

* Corresponding author.