



European
Desalination Society

Abstracts



Desalination and the Environment

Sani Resort • Halkidiki • Greece

22-25 SEPTEMBER 2003



CERTH
Center for Research
and Technology Hellas

159	Multi-objective optimization of membrane and thermal desalination plants <i>François Vince (France and Switzerland), Emmanuelle Aoustin, Philippe Bréant (France), François Maréchal (Switzerland)</i>	73
160	MSF process optimization taken into account availability <i>Nicolas Scenna, Sergio Mussati (Argentina)</i>	74
161	An empirical model for membrane flux prediction in ultrafiltration of surface water <i>Shengji Xia, Juanjuan Yao, Naiyun Gao (China)</i>	74
162	The influence of flow rate on CaCO_3 deposition and CO_2 - H_2O system in natural water piping systems <i>Aiman E. Al-Rawajfeh, Mazen Al-Odeinat, Z. Al-Qaisi (Jordan), J. Ulrich (Germany)</i>	75
163	Progressing the understanding of chemical inhibition of mineral scale by green inhibitors <i>A. Martinod (UK), M. Euvrard, A. Foissy (France), A. Neville (UK)</i>	75
164	A solar multiple effect distiller for Jordan <i>E.S. Hrayshat, Aim E. Al-Rawajfeh (Jordan)</i>	76
165	A new approach to meet the growing demand of professional training for the operating and management staff of desalination plants <i>Gebel Joachim, Yüce Süleyman (Germany)</i>	76
167	Desalination of produced water from oil production fields by membrane processes <i>Mehmet Cakmakci, Necati Kayaalp, Ismail Koyuncu (Turkey)</i>	77
168	Treatment of textile plant effluent by ultrafiltration and/or nanofiltration for water reuse <i>Cheima Fersi, Mahmoud Dhahbi (Tunisia)</i>	78
169	Removal of dyes from wastewater using micellar enhanced ultrafiltration <i>Narjess Zaghbani, Amor Hafiane, Mahmoud Dhahbi (Tunisia)</i>	78
170	The researches on the possibility of ultrasound field application in iron removal of water <i>Longina Stepniak, Urszula Kepa, Ewa Stanczyk-Mazanek (Poland)</i>	79
171	Experimental characterisation of clay material: water retention and shrinkage during moisture removal <i>Saber Chemkhi, Féthi Zagrouba (Tunisia)</i>	79
172	Water desalination cost literature: Review and assessment <i>Ioannis Karagiannis, Petros Soldatos (Greece)</i>	80
174	Novel approach combining physico-chemical characterizations and mass transfer modeling of nanofiltration (NF) and low pressure reverse osmosis (LPRO) membranes for brackish water desalination intensification <i>H. Dach, J. Leparç, A. Lhassani, M. Hafsi, M. Pontié (France)</i>	80
175	Nanofiltration operation for future large-scale pilot plants treatment of drinking waters defluoridation in the world <i>M. Pontié, C. Diawara, A. Lhassani, H. Dach J.C. Schrotter (France)</i>	81
176	Macroscopic and microscopic characterizations of a cellulosic ultrafiltration (UF) membrane fouled by a humic acids cake deposit: Intensification of RO pre-treatments <i>A. Thekkedath, W. Naceur, H. Suty, J.C. Schrotter, L. Aurret, M. Pontié (France)</i>	81
177	Views on Libyan National Plan (LNP) to resolve water shortage problem (WSP). Part Ib. Great Man-Made River (GMMR) Project — considering interest rate on capital costs <i>Abdulmonem Elhassadi (Libya)</i>	82
178	Influence of tetraethoxysilanes (TEOS) on properties of poly (vinylidene) fluoride (PVDF) ultrafiltration membrane <i>Xiaojuan Liu, Yuelian Peng, Shulan Ji (China)</i>	82
179	Enhanced phenol removal by floating fungal populations in high concentration phenol-fed membrane bioreactor <i>Soojeung Ahn, Shankar Congeevaram, Youn-Kyoo Choung, Joonhong Park (Korea)</i>	83
180	Characteristics and application of multiple membrane process in plating wastewater reutilization <i>Wenrui Zuo, Guoliang Zhang, Qin Meng, Hongzi Zhang (China)</i>	83
181	Bioseparation of cyclodextrins: effect of cross flow velocity on the PES membrane performance <i>A.M. Mimi Sakinah, Rosli Md Illias, A.F. Ismail, Osman Hassan, A.W. Zularisam (Malaysia)</i>	84

In this paper, we describe the process of adding tetraethoxysilanes (TEOS) into the polyvinylidene fluoride (PVDF) casting solution to prepare inorganic-organic hybrid membrane by casting and immersing into an HCl (pH = 1), NaOH (pH = 10) and water bath. All the obtained membranes were characterized by scanning electron microscope (SEM), ultrafiltration performance and mechanical property tests. The results showed TEOS could dramatically improve the mechanical properties (Tensile Strength and Youth Module) with the pure water flux and protein rejection stable. SEM photographs showed TEOS with different content could affect the microstructure of the hybrid, and different bath resulted to different microstructure. At last, the suitable bath and TEOS content was determined.

Keywords: PVDF; TEOS; Hybrid membrane

179

Enhanced phenol removal by floating fungal populations in high concentration phenol-fed membrane bioreactor

Soojeung Ahn, Shankar Congeevaram, Youn-Kyoo Choung, Joonhong Park

*Department of Civil and Environmental Engineering, Yonsei University, Seoul, Republic of Korea
Tel. +82-2-2123-5798; Fax +82-2-365-1965; email: parkj@yonsei.ac.kr*

Abstract

Sludge bulking and washing out phenomenon were observed at high concentration of phenol wastewater in conventional activated sludge processes. Very little is known about the role of "bulking" floating population in aromatic degradation. In this study we hypothesized that phenol-driven floating populations may have ability to efficiently degrade phenol. To examine this hypothesis, we used membrane bioreactor (MBR) to catch floating bulking microorganisms, and then characterized their phenol degradation and community analysis. In MBRs, phenol was fed individually as a sole carbon source in non-toxic (100 mg/L) and toxic (1,000 mg/L) concentrations. DO, pH, VSS, phenol, and TOC were measured constantly. Phenol degradation by floating filamentous populations was evaluated using initial phenol degradation rate assays. For community structure and non-settle microorganism identification, bacterial and fungal ribosomal RNA genes were amplified, cloned and sequenced.

Initially the higher phenol concentration resulted in inhibitive effect on growth in the sludge microbes. However, after an acclimation period, floating aggregates were formed and the fed amount of phenol was completely degraded. Microscopic investigation showed that filamentous microorganisms were dominant in the floating aggregates. The following initial degradation assays revealed that the non-settling populations exhibited at least five time greater rate of phenol degradation than the settling sludge populations. The following 18S rDNA analysis revealed that dominant microorganisms in non-settling portions were fungal populations. The findings suggest that MBR is able to capture the floating fungal populations, resulting in an enhancement of phenol removal in the reactor.

Keywords: MBR; Phenol; Filamentous population; Community structure; Fungal ribosomal RNA gen

180

Characteristics and application of multiple membrane process in plating wastewater reutilization

Wenrui Zuo^a, Guoliang Zhang^a, Qin Meng^b, Hongzi Zhang^b

*^aCollege of Biological and Environmental Engineering, Zhejiang University of Technology,
Hangzhou 310014, P.R. China*

*^bCollege of Materials Science and Chemical Engineering, Zhejiang University, Hangzhou 310027, P.R. China
Tel. +86 (571) 88320863; Fax +86 (571) 88320863; email: guoliangz@zjut.edu.cn*

Abstract

A multiple membrane process aimed at reutilization of plating combined wastewater after physical and chemical pretreatment in mechanical industry was developed for selective separation to reduce cost and mitigated the increasing heavy metal pollution. The process was divided into three stages: firstly, microfiltration (MF) and ultrafiltration (UF) was used to separate the possible organic and suspended mat-