Desalination and Water Treatment
www.deswater.com
1944-3994/1944-3986 © 2012 Desalination Publications. All rights reserved
doi: 10/5004/dwt.2012.2499

Taylor & Francis
Taylor & Francis Group

42 (2012) 144–154
April

Thermodynamic diagnostic of electrons densities in gas bubbles in aerated saturated refinery wastewater

Mirjana Miladin Ševaljević[a,*], Stojan Nikola Simić[b], Petar Vlado Ševaljević[c]

[a]*High Technical School, Đorđa Stratimirovića 23, in Zrenjanin, University of Novi Sad, Serbia*
Tel./Fax: 381 23 565 896; email: sevaljevic.mirjana @gmail.com
[b]*Oil refinery a.d. Modriča, Bosnia and Herzegovina*
[c]*Petrol, Ljubljana, Slovenija*

Received 20 October 2010; Accepted 29 August 2011

ABSTRACT

Electro-chemical potentials of adsorbed hydrogen on active centers could help energy efficiency of oxygen transport in the aerated saturated refinery wastewater to be optimized. In stationary regime, by using of the same membrane diffuser, the true understanding of the spontaneous fastest parallel exchange of electrons by Boltzmann collisions and slowest oxygen mass diffusion transport by adsorption can be attained. This paper presents diagnostic of electrons density in the gas bubbles in aerated saturated refinery wastewater, according to the criteria of partial local thermodynamic equilibrium (PLTE). By the different stationary air flows, different water tank height and different motor oil content it was obtained that water entropy driven electrons density transport through the monolayer of the adsorbed air bubble controls energy efficiency of oxygen transport.

Keywords: Perforated membrane air distributor; Refinery waste water; Aeration regimes; PLTE of electrons and hydrogen ions; Saturated water; Polarized air bubbles; Electrons densities; Aeration energy efficiency

*Corresponding author.