Accepted Manuscript

Effect of air pressure on the electro-Fenton process at carbon felt electrodes

J.F. Perez, S. Sabatino, A. Galia, M.A. Rodrigo, J. Llanos, C. Sáez, O. Scialdone

PII: S0013-4686(18)30763-1

DOI: 10.1016/j.electacta.2018.04.031

Reference: EA 31598

To appear in: *Electrochimica Acta*

Received Date: 21 July 2017

Revised Date: 7 March 2018

Accepted Date: 4 April 2018

Please cite this article as: J.F. Perez, S. Sabatino, A. Galia, M.A. Rodrigo, J. Llanos, C. Sáez, O. Scialdone, Effect of air pressure on the electro-Fenton process at carbon felt electrodes, *Electrochimica Acta* (2018), doi: 10.1016/j.electacta.2018.04.031.

Effect of air pressure on the electro-Fenton process at carbon felt electrodes

J. F. Perez [a], S. Sabatino[b], A. Galia[b], M. A. Rodrigo[a], J. Llanos[a], C. Sáez[a], O. Scialdone[b,*]

[a] Department of Chemical Engineering, Faculty of Chemical Sciences & Technologies, Ciudad Real, Universidad de Castilla-La Mancha, Ciudad Real 13071, Spain

[b] Dipartimento dell'Innovazione Industriale e Digitale, Ingegneria Chimica, Gestionale, Informatica, Meccanica, Università degli Studi di Palermo, Palermo 90128, Italy

*onofrio.scialdone@unipa.it

Abstract

The effect of air pressure on electro-Fenton (PrEF process) was evaluated using two organic substances (maleic acid and Acid Orange 7) as model organic pollutants. First experiments were performed using a conventional carbon felt (CF) cathode. At room pressure, a slow removal of maleic acid was obtained, together with the generation of formic acid. Conversely, using pressurized air, the removal of maleic acid was dramatically accelerated and the formation of formic acid was not detected. The utilization of a carbon felt modified by the deposition of carbon black + PTFE mixture (MCF) and of pressurized air allowed to achieve even faster and almost total (> 95 %) removal of total organic carbon (TOC). Interestingly, the abatement resulted higher than the one obtained previously by direct anodic oxidation at boron doped diamond under comparable conditions. Similarly, in the case of Acid Orange 7 (AO7) the