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Production of coagulant reagents for electro-coagulation processes at low current densities

Engracia Lacasa, Pablo Cañizares, Manuel A. Rodrigo*

Department of Chemical Engineering, Faculty of Chemical Sciences, University of Castilla-la Mancha, Avda. Camilo José Cela, 12. 13071 Ciudad Real, Spain
Tel. +34 926 29 53 00 Ext. 96353; Fax: +34 926 29 52 56; email: manuel.rodrigo@uclm.es

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ABSTRACT

In this work, the electrochemical production with low current densities of iron and aluminium reagents for electro-coagulation processes has been studied. It has been found that pH is a very important parameter, being strongly related to the speciation of iron in terms of iron (II) or iron (III) species, and also to the efficiency of the electrochemical reagent-dosing process. Iron (II) species are only significant under acidic conditions because in neutral and alkaline conditions iron (II) is rapidly transformed into iron (III). Efficiencies in the dissolution of the metals are very high and, in some cases, over the value expected for a 100% – efficiency (super-faradaic efficiencies), due to the non-electrolytic dissolution of the electrodes, which is very important for iron under acidic conditions, and even more important for aluminium at alkaline pHs. This significant non-electrolytic contribution explains the different trends observed in the efficiency changes with current density.

Keywords: Electro-coagulation; Iron; Super-faradaic efficiencies; Electro-dissolution; Aluminium; Coagulants

*Corresponding author.