# An optimization and characterization study on sodium ferrate production by electrochemical method

Document Type : Research Paper

**Authors**

Sina Samimi-sedeh [1] ; Ehsan Saebnoori [2] ; Ali Hassanzadeh [1]

[1] Advanced Materials Research Center, Department of Materials Engineering, Najafabad Branch, Islamic Azad University, Najafabad, Iran

[2] Islamic Azad University- Najafabad Branch

**Abstract**

Current efficiency and energy consumption are two important factors in sodium ferrate synthesis. In this article, sodium ferrate was produced by the electrochemical method and the effects of different synthesized parameters such as applied current density, sodium hydroxide concentration and temperature on current efficiency and energy consumption have been studied. Decomposition of sodium ferrate, anode passivation and deviations in anodic and cathodic reaction rates with time have been tested by weight loss test, potentiodynamic polarization, and UV-visible spectroscopy, respectively. Also, the impact of each one on current efficiency and its consequence on energy consumption rate were studied. The results showed that the optimum conditions were 3.94 mA/cm2, 16 M NaOH and 50 oC for applied current density, sodium hydroxide concentration, and temperature, respectively. In this situation, the current efficiency was calculated as 91.7% and the energy consumption reached 1.91 kW.h/kg.
Keywords: Electrochemical method; Sodium ferrate; Alkaline solution; Current efficiency; Energy consumption.

**Keywords**

Electrochemical method ; Sodium ferrate ; Alkaline solution ; Current efficiency ;

Energy consumption