Surfactant Effect as Template Agent on the Morphological and Electrochemical Properties of V_2O_5

Fernanda R. Lemos¹, Leonardo M. da Silva², Dane T. Cestarolli¹, Elidia M. Guerra^{1,*}

¹ Department of Chemistry, Biotechnology and Bioprocess Engineering, Federal University of São João Del Rei, Ouro Branco, MG, Brazil

² Department of Chemistry, Federal University of Jequitinhonha and Mucuri Valley, Diamantina-MG, Brazil

*E-mail: elidiaguerra@ufsj.edu.br

doi: 10.20964/2016.06.3

Received: 19 February 2016 / Accepted: 22 March 2016 / Published: 4 May 2016

The effect of the release of cetylpyridinium chloride surfactant into the V_2O_5 following the behavior of lithium intercalation into an electrode containing the V_2O_5 film has been investigated. X-ray diffraction patterns indicated formation of a lamellar structure. After the calcination and release of surfactant occurred the formation of an orthorhombic structure. Scanning Electronic Microscopy shows that the route employed for the preparation of an open network V_2O_5 structure was successful. The electrochemical performance of the open network structured material compared with a compact structure of V_2O_5 , via sol-gel route as lithium intercalation cathode materials were evaluated. The open network material reaches stability more easily and presents a high total voltammetric charge after several cycles compared with the V_2O_5 xerogel. Lithium intercalation into the V_2O_5 electrode is very influenced by open network surface and surface irregularity, in contrast with the compact surface of the V_2O_5 xerogel.

Keywords: Intercalation reaction; V_2O_5 xerogel; open network; surfactant; electrochemical studies

[FULL TEXT](#)

© 2016 The Authors. Published by ESG (www.electrochemsci.org). This article is an open access article distributed under the terms and conditions of the Creative Commons Attribution license (<http://creativecommons.org/licenses/by/4.0/>).