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Scientific Research ABSTRACTS

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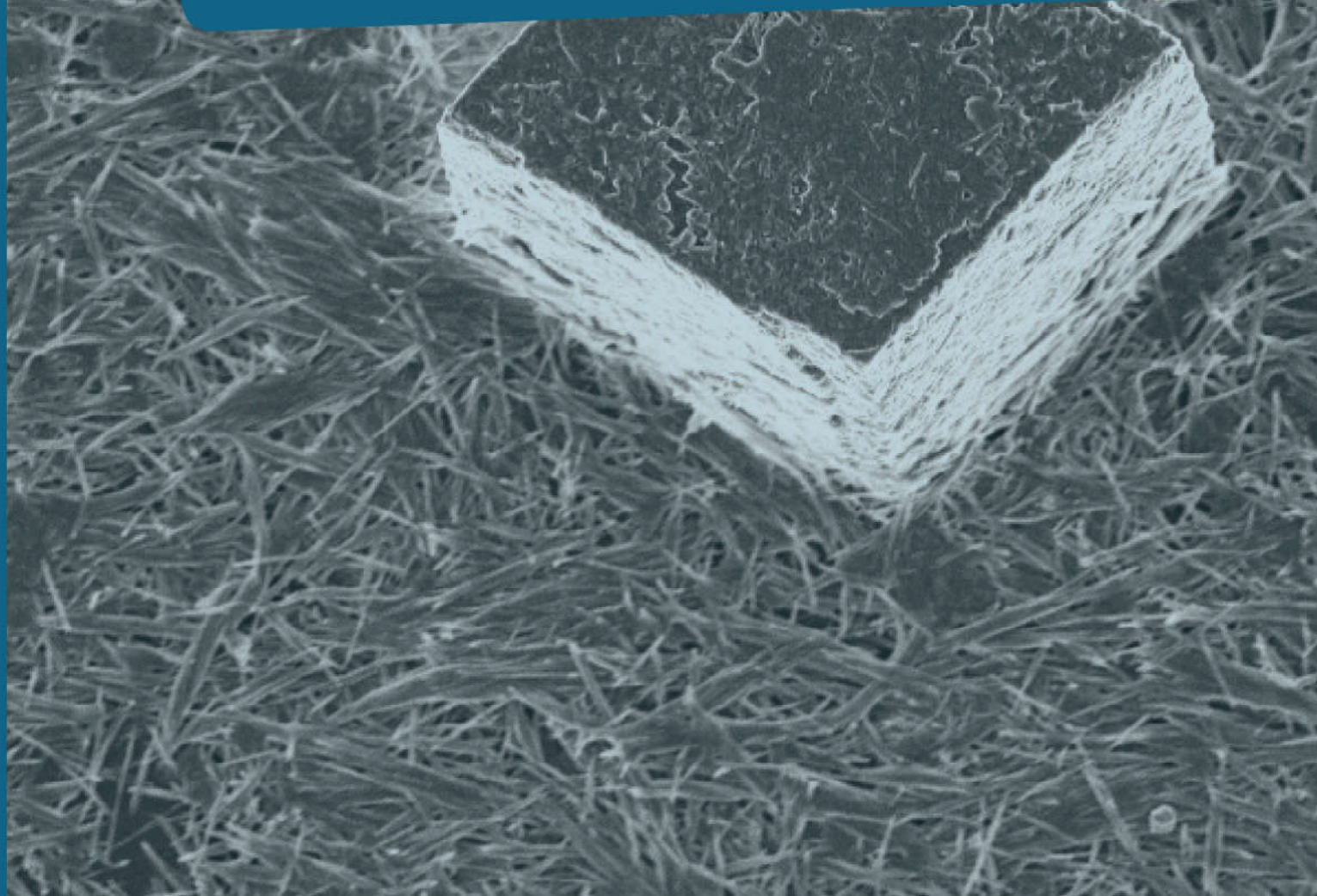
CLAYS, FROM THE OCEANS TO SPACE

ICC 2017
GRANADA, SPAIN

XVI International Clay Conference



XVI
International Clay Conference
ICC 2017

Granada, Spain
July, 17-21, 2017

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XVI ICC - 16TH INTERNATIONAL CLAY CONFERENCE

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- Consejo Superior de Investigaciones Científicas (CSIC)
- Universidad de Granada (UGR)
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INFLUENCE OF CLAY-BOUND SODIUM-DODECYL SULFATE ON ELECTROCHEMICAL BEHAVIOUR OF NICOTINE

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In this study, electrode coating based on sodium dodecyl sulfate (SDS) bound to smectite clay was synthesized and characterized. In order to enable SDS bonding to clay surface, the acid modification of clay was previously performed at 90 ºC for 2 h. The acid modification changed surface charge of smectite into positive, thus enabling electrostatic interaction with negative sulfate ions from SDS. The presence of SDS in SDS/acid modified smectite (SDS/AMS) structure was confirmed by elemental analysis. SEM analysis revealed the morphology of the obtained sample. Glassy carbon electrode (GCE) was modified with a suspension of the synthesized SDS/AMS and Nafion® solution (GCE-SDS/AMS) and a uniform film was obtained [1]. The electrochemical behaviour of nicotine was tested with modified GCE using cyclic voltammetry. It has been shown previously that the electrochemical response of nicotine on carbon based electrodes can be improved by adding SDS into electrolyte solution [2]. On the other hand, clays have the ability to preconcentrate analytes because of their porous structure and the presence of potential active sites [3]. Acid activated clays can be modified with SDS [4]. Therefore, the aim of this study was to investigate the influence of SDS bound to smectite on the electrochemical behaviour of nicotine. Britton-Robinson (BR) (0.1 M) supporting electrolyte buffer solutions in the pH range from 2.0-10.0 was used for preparing the supporting electrolyte of nicotine. The influence of the pH of the supporting electrolyte, scan rate and accumulation time were investigated and discussed. The GCE-SDS/AMS exhibited similar electrochemical behaviour in comparison with the bare GCE but with the differences in the intensity and position of peak corresponding to nicotine oxidation. The intensity of the oxidation peak was lower on the GCE-SDS/AMS that on the bare GCE. In contrast, the onset and peak potentials were significantly shifted towards less positive values on the GCE-SDS/AMS comparing with the bare GCE. On the other hand, the nicotine peak intensity increased gradually as the accumulation time increased. Therefore, selecting the appropriate accumulation time the sensitivity of the GCE-SDS/AMS can be improved. The above results demonstrate the possibility of use the synthesized SDS/AMS in the nicotine electrooxidation process.

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