

Accepted Manuscript

In-situ electrochemical surface-enhanced Raman spectroscopy study of formic acid electrooxidation at variable temperatures by high-frequency heating technology

Wen Chang Xie, Yun Ling, Ya Zhen Zhang, He Pan, Guo Kun Liu, Jing Tang



PII: S0013-4686(18)31225-8

DOI: [10.1016/j.electacta.2018.05.167](https://doi.org/10.1016/j.electacta.2018.05.167)

Reference: EA 31953

To appear in: *Electrochimica Acta*

Received Date: 24 March 2018

Revised Date: 16 May 2018

Accepted Date: 26 May 2018

Please cite this article as: W. Chang Xie, Y. Ling, Y.Z. Zhang, H. Pan, G.K. Liu, J. Tang, In-situ electrochemical surface-enhanced Raman spectroscopy study of formic acid electrooxidation at variable temperatures by high-frequency heating technology, *Electrochimica Acta* (2018), doi: 10.1016/j.electacta.2018.05.167.

This is a PDF file of an unedited manuscript that has been accepted for publication. As a service to our customers we are providing this early version of the manuscript. The manuscript will undergo copyediting, typesetting, and review of the resulting proof before it is published in its final form. Please note that during the production process errors may be discovered which could affect the content, and all legal disclaimers that apply to the journal pertain.

In-situ electrochemical surface-enhanced Raman spectroscopy study of formic acid electrooxidation at variable temperatures by high-frequency heating technology

Wen Chang Xie ^a, Yun Ling ^a, Ya Zhen Zhang ^a, He Pan ^a, Guo Kun Liu ^{b,*}, Jing Tang ^{a,*}

^a Key Laboratory for Analytical Science of Food Safety and Biology, Ministry of Education, College of Chemistry, Fuzhou University, Fuzhou, 350116, China

^b State Key Laboratory of Marine Environmental Science, College of the Environment and Ecology, Xiamen University, Xiamen, 361002, China

Abstract

The combination of in-situ electrochemical surface-enhanced Raman spectroscopy (EC-SERS) and high-frequency heating technology was used to investigate formic acid (HCOOH) electrooxidation at variable temperatures. Any preset temperature could be adjusted within 1 second on the surface of the working electrode (thermocouple microelectrode, TCME) by using the high-frequency heating technology. Cyclic voltammetry and EC-SERS were used to investigate the electrooxidation behavior of HCOOH on the surface of Au@Pt nanoparticles. Cyclic voltammetry showed that elevated temperatures improve the catalytic activity of Au@Pt/TCME toward HCOOH oxidation. The EC-SERS results showed that the intensity of the Pt-C band decreased with an increase in temperature, which indicates that a high temperature favors the oxidative desorption of CO from the Pt surface and improves the catalytic reaction. This work could be used to screen catalysts for HCOOH electrooxidation at high temperature, or for other investigations of EC-SERS at variable temperatures.

Keywords: Formic acid; Electrocatalysis; Surface-enhanced Raman spectroscopy; Au@Pt ; Temperature modulation

Download English Version:

<https://daneshyari.com/en/article/6602364>

Download Persian Version:

<https://daneshyari.com/article/6602364>

[Daneshyari.com](https://daneshyari.com)