

Accepted Manuscript

Electrochemically roughened gold microelectrode for surface-enhanced Raman spectroscopy

Wei Wang, Yi-Fan Huang, Dong-Yu Liu, Fang-Fang Wang, Zhong-Qun Tian, Dongping Zhan

PII: S1572-6657(16)30156-4
DOI: doi: [10.1016/j.jelechem.2016.04.008](https://doi.org/10.1016/j.jelechem.2016.04.008)
Reference: JEAC 2586

To appear in: *Journal of Electroanalytical Chemistry*

Received date: 22 February 2016
Revised date: 24 March 2016
Accepted date: 5 April 2016

Please cite this article as: Wei Wang, Yi-Fan Huang, Dong-Yu Liu, Fang-Fang Wang, Zhong-Qun Tian, Dongping Zhan, Electrochemically roughened gold microelectrode for surface-enhanced Raman spectroscopy, *Journal of Electroanalytical Chemistry* (2016), doi: [10.1016/j.jelechem.2016.04.008](https://doi.org/10.1016/j.jelechem.2016.04.008)

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.



Electrochemically Roughened Gold Microelectrode for Surface-enhanced Raman Spectroscopy

Wei Wang, Yi-Fan Huang, Dong-Yu Liu, Fang-Fang Wang, Zhong-Qun Tian, Dongping Zhan,*

State Key Laboratory of Physical Chemistry of Solid Surfaces, Collaborative Innovation Center of Chemistry for Energy Materials (iChEM), and Department of Chemistry, College of Chemistry and Chemical Engineering, Xiamen University, Xiamen 361005, China

Abstract

Ultramicroelectrode (UME) has a rapid response time to obtain electrochemical transient information. To obtain the real-time transient Raman information, we introduce the Au UMEs into the measurements of electrochemical surface-enhanced Raman spectroscopy (EC-SERS). However, the SEM and electrochemical results show that the roughened Au UMEs by conventional procedure for macroelectrodes will produce a microcavity because the enhanced mass transfer makes Au dissolved irreversibly. Thus, a roughening program based on pulse potential voltammetry is proposed to improve SERS activity of Au UMEs. We find a porous nanostructured film can be formed on the surface of Au UMEs, which exhibits good stability and stronger intensity in the EC-SERS experiments.

Keywords: Surface-enhanced Raman spectroscopy, ultramicroelectrode, Roughing procedure

1. Introduction

Ultramicroelectrodes (UMEs) have been extensively applied into fundamental electrochemistry, electrochemical analysis and many other research areas due to their outstanding properties, such as small size for microsystem, negligible IR drop, rapid

Download English Version:

<https://daneshyari.com/en/article/4908312>

Download Persian Version:

<https://daneshyari.com/article/4908312>

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