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# Sensors and Materials

## CONTENTS

### SPECIAL ISSUE ON CARBON MATERIAL-BASED CHEMICAL AND BIOCHEMICAL SENSORS GUEST EDITORS, YUKO UENO (NTT BASIC RESEARCH LABORATORIES) AND OSAMU NIWA (SAITAMA INSTITUTE OF TECHNOLOGY)

#### Preface

#### Research Papers of Special Issue

##### *Materials*

**Invited Paper:** Modification of Boron-doped Diamond Electrodes with Platinum to Increase the Stability and Sensitivity of Haemoglobin-based Acrylamide Sensors (S & M 1838)

Retno Wulandari, Tribidasari Anggraningrum Ivandini, Irkham, Endang Saepudin,  
and Yasuaki Einaga ..... 1105

Functionalization of a Diamond Surface through N<sub>2</sub> and H<sub>2</sub> Irradiation for Estrogen (17 $\beta$ -estradiol) Aptamer Sensing (S & M 1839)

Evi Suaebah, Masataka Hasegawa, Jorge J. Buendia, Wenxi Fei, Maneesh Chandran,  
Alon Hoffman, and Hiroshi Kawarada..... 1119

Selective Au Electrodeposition on Au Nanoparticles Embedded in Carbon Film Electrode for Se(IV) Detection (S & M 1840)

Shunsuke Shiba, Shota Takahashi, Tomoyuki Kamata, Hiromitsu Hachiya, Dai Kato,  
and Osamu Niwa ..... 1155

Optical Studies of Graphene Oxide/poly(amidoamine) Dendrimer Composite Thin Film and Its Potential for Sensing Hg<sup>2+</sup> Using Surface Plasmon Resonance Spectroscopy (S & M 1841)

Mohammad Danial Aizad Roshidi, Yap Wing Fen, Nur Alia Sheh Omar, Silvan Saleviter,  
and Wan Mohd Ebtisyam Mustaqim Mohd Danial..... 1147

Adhesive Layer for Robust Graphene Transferred on Solid Support and Its Application to Graphene Microelectrode Manufacturing (S & M 1842)

Yuko Ueno, Kenji Dendo, Yukihide Homma, and Kazuaki Furukawa..... 1157

##### *Sensors*

**Invited Paper:** Facile Preparation of Hemin-functionalized Electrochemically Reduced Graphene Oxide Nanocomposite for H<sub>2</sub>O<sub>2</sub> Biosensing (S & M 1843)

Zhi Chen, Dong Liu, Chengxi Zhu, Libo Li, and Tianyan You ..... 1167

Phenazine dye- and Enzyme-modified Plastic Formed Carbon Electrode for Amperometric Dihydropyridinamide Adenine Dinucleotide and Glucose Sensing (S & M 1844)

Yue Wang and Yasushi Hasebe..... 1181

Carbon-black-doped Polyimide-modified Glassy Carbon Electrode for Sensitive Nonenzymatic Amperometric Determination of Hydrogen Peroxide (S & M 1845)

Yue Wang, Lin Chen, Yan Zhang, Qingnan Wang, Ruidan Ma, Yasushi Hasebe,  
Zhiqiang Zhang, and Zhizhi Hu ..... 1191

An L-lactate Biosensor Based on Printed Organic Inverter Circuitry and with a Tunable Detection Limit  
(S & M 1846)

Kuniaki Nagamine, Taisei Mano, Rei Shiwaku, Hiroyuki Furusawa, Hiroyuki Matsui,  
Daisuke Kumaki, and Shizuo Tokito.....1205

Coulometric Analysis of Nitrite Using Electrochemically Activated Carbon Felt Electrode (S & M 1847)

Satrio Kuntolaksone and Hiroaki Matsuura.....1215

## SPECIAL ISSUE ON CARBON MATERIAL-BASED CHEMICAL AND BIOCHEMICAL SENSORS

### PREFACE



Carbon is a traditional and well-known material and has been employed mainly for electrochemical devices including batteries, fuel cells, and chemical and biosensors. This is because carbon materials have sufficient conductivity and electrochemical activity for electrode applications and are also inexpensive. Various electrode materials have been fabricated such as carbon fiber, carbon black, and carbon felt, which have a wide surface area suitable for batteries and sensing materials. In contrast, carbon film electrodes have also been improved using vacuum technologies including sputtering and chemical vapor deposition. These film electrodes are convenient since they can be fabricated into any shapes and sizes to develop micro- and nanostructured electrodes. More practically, printing technology using newly developed carbon inks have been developed for flexible, wearable, and disposable sensing devices and considered to be applied in future health care devices combined with the Internet of Things (IoT).

Recently, new carbon materials including carbon nanotubes (CNTs), graphene, and boron-doped diamond (BDD) have been reported. CNTs and graphene have unique characteristics such as high electrocatalytic activity and unique optical property. In contrast, BDD electrodes are extremely stable and show a wide potential window. Owing to the above-mentioned unique performances and wide variety of structures of carbon materials, various kinds of chemical and biochemical sensors have been developed on the basis of such carbon materials. This special issue will focus on traditional and new carbon materials for biosensors; environmental, electrochemical, and optical sensors; and microfluidic devices. Finally, we would like to thank Professor Makoto Ishida, the Editor-in-Chief, Professor Kohji Mitsubayashi, the Associate Editor, and Ms. Misako Sakano for this opportunity to edit this special issue for *Sensors and Materials*, and we also thank all the authors and reviewers for their support.

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