Symposium 15

Symposium 15: Advanced Ceramic Sensor Technologies

Main Organizers
- Ichiro Matsubara, AIST, Japan
- Linan An, Univ. Central Florida, USA
- Hajime Haneda, NIMS, Japan

Co-Organizers
- Sheikh Akbar, Ohio State Univ., USA
- Pelagia-Irene Gouma, State Univ. New York, USA
- Jong-Heun Lee, Korea Univ., Korea
- Kengo Shimanoe, Kyusyu Univ., Japan
- Woosuck Shin, AIST, Japan
- Chengying Xu, Univ. Central Florida, USA
- Hideaki Yagi, NGK SPARK PLUG CO. LTD., Japan

Oral Session

Wednesday, November 17

Room: 702

9:00 - 9:45

Chair: Nobuhito Imanaka (Osaka University, Japan)

9:00-9:15
S15-001 **Low-temperature, CO Selective Catalytic Materials for Sensor Application**
N. Labhsetwar[1], S. Rayalu[1], A. Bansiwal[1], T. Mitsuhashi[2], H. Haneda[2]; [1]National Environmental Engineering Research Institute, India, [2]National Institute for Materials Science, Japan

9:15 - 9:30
S15-002 **Solid Electrolyte Gas Sensors Based on Cyclic Voltammetry with One Active Electrode**
G. Jasinski, S. Molin, P. Jasinski; Gdansk University of Technology, Poland

9:30 - 9:45
S15-003 **Effects of Sr Addition to La-Based Perovskite Sensing-Electrode on YSZ-Based Amperometric-Type NOx Sensor**
T. Ueda[1], M. Umeda[2], H. Okawa[1], S. Takahashi[1,2]; [1]Japan Fine Ceramics Center, Japan, [2]Daido University, Japan

9:45 - 10:30

Chair: Jong-Heun Lee (Korea University, Korea)

9:45 - 10:00
S15-004 **Solid-State Impedancemetric NOx Sensors Using Lithium-Ion Conductor and Perovskite-Type Oxide Receptor**
Y. Shimizu[1], S. Kuramoto[1], H.-C. Cho[1], S. Takase[1], J.-H. Song[2]; [1]Kyushu Institute of Technology, Japan, [2]Paichai University, Korea

10:00 - 10:15
S15-005 **Inflammable Gas Sensing Properties of Solid-electrolyte Based Gas Sensors Using an Auxiliary Oxide Electrode**
J. Iwabuchi, T. Hyodo, Y. Shimizu; Nagasaki University, Japan

10:15 - 10:30
S15-006 **Novel Ammonia Gas Sensing with Multivalent Ion Conducting Solids**
N. Imanaka; Osaka University, Japan

10:30 - 10:45 **Break**

10:45 - 12:00

Chair: Shunichi Hishita (National Institute for Materials Science, Japan)

10:45 - 11:15

S15-007 **Sensing Technology with Elasticoluminescence -Visualizing 'Invisible' Defects in Structures- (Invited)**

C.-N. Xu; National Institute of Advanced Industrial Science and Technology, Japan

11:15 - 11:30

S15-008 **Strong Mechanoluminescence from Oxynitridosilicate Phosphors**

L. Zhang[1], C.-N. Xu[1,2,3], H. Yamada[1,2]; [1]National Institute of Advanced Industrial Science and Technology, Japan, [2]Kyushu University, Japan, [3]Japan Science and Technology Agency, Japan

11:30 - 11:45

S15-009 **How to Enhance the Properties of Lead-free BZT-xBCT Ceramics**

H. Bao[1,2], D. Xue[1,2], J. Gao[1,2], X. Ren[1,2]; [1]National Institute for Materials Science, Japan, [2]Xi'an Jiaotong University, China

11:45 - 12:00

S15-010 **Non-hystereric Matal-to-insulator Transition in VO_2 Films Grown by Excier-laser-assisted Matal Organic Deposition Process**

M. Nishikawa[1], T. Nakajima[2], T. Kumagai[2], T. Okutani[1], T. Tsuchiya[2]; [1]Yokohama National University, Japan, [2]National Institute of Advanced Industrial Science and Technology, Japan

13:15 - 14:15

Chair: Woosuck Shin (National Institute of Advanced Industrial Science and Technology, Japan)

13:15 - 13:45

S15-011 **Selective Ceramic Chemosensors Based on Polymorph Stability (Invited)**

P. I. Gouma; SUNY, USA

13:45 - 14:15

S15-012 **Miniature Sensor Systems for Hand-Held Non-Invasive Diagnostic Tools: Monitoring for Exhaled Metabolites in Human Breath (Invited)**

C. E. Davis; University of California, USA

14:15 - 15:00

Chair: Pelagia-Irene Gouma (State University of New York, USA)

14:15 - 14:30

S15-013 **Acetone Nanosensor and Breathanalysis Device for Diabetes Monitoring**

L. Wang[1], M. Stanacevic[2], P. I. Gouma[2]; [1]Univ British Columbia, Canada, [2]SUNY, USA

14:30 - 14:45

S15-014 **Monitoring for COPD Patients Using E-NOSE/SPME System**

H.-G. Byun[1], J.-S. Huh[2], J.-O. Lim[2]; [1]Kangwon National University, Korea, [2]Kyungpook National University, Korea

14:45 - 15:00

S15-015 **Surface Plasmonic Biosensor Using Gold/Alumina Nanocomposite Substrates**

N. Koshizaki, S. Gao, H. Tokuhisa, E. Koyama; National Institute of Advanced Industrial Science and Technology, Japan

15:00 - 15:15 **Break**

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15:15 - 16:15

Chair: Ichiro Matsubara (National Institute of Advanced Industrial Science and Technology, Japan)

15:15 - 15:45
S15-016 **Advanced Sensors for Fossil Energy Applications: Approaches for Sensing in Harsh Environments (Invited)**
R. R. Romanosky, S. M. Maley; National Energy Technology Laboratory, USA

15:45 - 16:00
S15-017 **Toward the Understanding of Relationship between Grain Size Effect and Utility Factor for Semiconductor Gas Sensors**
K. Shimanoe, S. Fujiyama, M. Yuasa, T. Kida; Kyushu University, Japan

16:00 - 16:15
S15-018 **Single-Crystal-Like SnO_2 Films: Preparation and Property**
S. Hishita, P. Janeček, I. Sakaguchi, H. Haneda; National Institute for Materials Science, Japan

16:15 - 17:00

Chair: Kengo Shimanoe (Kyusyu University, Japan)

16:15 - 16:30
S15-019 **Patterned Micro Gas Sensor Fabricated by Micro-molding in Capillary Process Using a Low Concentration of SnO_2 Colloidal Suspension**
H. Fudouzi, Y. Sakka; National Institute for Materials Science, Japan

16:30 - 16:45
S15-020 **Change in Optical and Electrical Properties of Semiconductive Oxides under the Operating Conditions of Gas Sensors**
Y. Matsushima, H. Mori-ai, R. Toyoda, T. Kawai; Yamagata University, Japan

16:45 - 17:00
S15-021 **Luminescence Properties of Doped SnO_2 Powders and Films Designed for Gas Sensor Application**
G. Kovotcenkov, C. Beongki; Gwangju Institute of Science and Technology, Korea

Thursday, November 18

Room: 702

9:15 - 10:30

Chair: Takeo Hyodo (Nagasaki University, Japan)

9:15 - 9:45
S15-022 **Hot Spot in $GdBa_2Cu_3O_{7-\delta}$-Based Composite Ceramics Rods and Their Applications for Oxygen Sensors (Invited)**
T. Okamoto, M. Takata; Nagaoka University of Technology, Japan

9:45 - 10:00
S15-023 **Effect of Coating Thickness on Characteristics of Hot Spot Oxygen Sensor Consisting of $GdBa_2Cu_3O_{7-\delta}$ Coat and Gd_2BaCuO_5 Core**
S. Fujihara, Y. Kuroki, T. Okamoto, M. Takata; Nagaoka University of Technology, Japan

10:00 - 10:15
S15-024 **Diffusion Phenomena in ZnO Thin Films Deposited by PLD Method**
H. Haneda[1,2], I. Sakaguchi[1], K. Matsumoto[2], T. Ogino[2], S. Hishita[1], Y. Adachi[1], T. Ohgaki[1], N. Ohashi; [1]National Institute for Materiasl Science, Japan, [2]Kyushu University, Japan

10:15 - 10:30
S15-025 **UV-assisted Electroless Deposition of ZnO Nano Rods and Gas Sensing Property**
K. Watanabe, Y. Moriura, N. Saito, T. Ohgaki, S. Hishita, N. Ohashi, H. Haneda; National Institure for Materials Science, Japan

10:30 - 10:45 **Break**

10:45 - 11:45

Chair: Hajime Haneda (National Institute for Materials Science, Japan)

10:45 - 11:15
S15-026 **Formaldehyde Sensors Based on Flame Spray Pyrolysis Sn Doped In_2O_3 (ITO) Materials (Invited)**
N. Barsan[1], J. Kemmler[1], S. Pokhrel[2], L. Maedler[2], U. Weimar[1]; [1]University of Tuebingen, Germany, [2]University of Bremen, Germany

11:15 - 11:30
S15-027 **Insights into Gas Sensor Operation from *In-situ* and Operando Spectroscopic Characterization**
A. Gurlo; Technische Universitaet Darmstadt, Germany

11:30 - 11:45
S15-028 **Electrochemical Immobilization of Fluorescent Labeled Probe Molecules on a FTO Surface for Affinity Detection Based on Photo-excited Current**
T. Haruyama, S. Matsuyama, T. Cho; Kyushu Institute of Technology, Japan

13:15 - 14:30

Chair: Nicolae Barsan (University of Tuebingen, Germany)

13:15 - 13:30
S15-029 **Diode-type Gas Sensors Fabricated with a Titania Film on a Ti Plate and Pd-Pt Electrodes -Effects of Polymer Coating on the Hydrogen-sensing Properties-**
T. Hyodo, M. Nakaoka, Y. Shimizu; Nagasaki University, Japan

13:30 - 13:45
S15-030 **MEMS-type Gas Sensor Based on TiO_2 Nanotube for VOCs Detection**
M. Yuasa, M.-H. Seo, T. Kida, N. Yamazoe, K. Shimanoe; Kyushu University, Japan

13:45 - 14:00
S15-031 **Tailored 3D CuO Nanogrid Formation for Sensors and Photocatalysts**
J. Lee, P. I. Gouma; State University of New York, USA

14:00 - 14:15
S15-032 **Suppression of the NO_2 Interference in WO_3-Based Ammonia Sensors by Chromium Doping**
M. Epifani[1], T. Andreu[2,3], R. Díaz[3], J. Arbiol[4], P. Siciliano[1], J. R. Morante[2,3]; [1]CNR-IMM, Italy, [2]Institut de Recerca en Energia de Catalunya, Spain, [3]Universitat de Barcelona, Spain, [4]CSIC, Spain

14:15 - 14:30
S15-033 **NO_2 Adsorption Properties on Various WO_3 Crystals and Relation with Their Sensing Properties**
Z. Meng, C. Kitagawa, T. Hashishin, J. Tamaki; Ritsumeikan University, Japan

Symposium 15

Poster Session

Tuesday, November 16

Room: Event Hall

12:00 - 14:00

S15-P001 Thermoelectric Gas Sensors of Different Catalyst Oxides and Heater Metals
W. Shin[1], M. Nishibori[1], N. Izu[1], T. Itoh[1], I. Matsubara[1], N. Watanabe[2], T. Kasuga[2]; [1]National Institute of Advanced Industrial Science and Technology, Japan, [2]Nagoya Institute of Technology, Japan

S15-P002 Synthesis of Catalyst-Functaionalized Oxide Hollow Spheres for Gas Sensor Applications
S.-J. Kim, I.-S. Hwang, J.-K. Choi, J.-H. Lee; Korea University, Korea

S15-P003 VOC Sensing Properties of CeO_2 Thick Film Elements
I. Matsubara[1], T. Itoh[1], N. Izu[1], W. Shin[1], M. Nishibori[1], K. Suzuki[2], S. Nakamura[2], K. Kanda[2]; [1]National Institute of Advanced Industrial Science and Techniligy, Japan, [2]New Cosmos Electric Co., Ltd., Japan

S15-P004 Polarity Determination of ZnO Films by X-ray Diffraction Using Anomalous Dispersion
Y. Adachi, N. Ohashi, I. Sakaguchi, H. Haneda; National Institue for Materials Science, Japan

S15-P005 Aging Effects of Pt, Pd, and Au loaded SnO_2 as VOC Sensors
T. Itoh[1], I. Matsubara[1], M. Kadosaki[2], Y. Sakai[2], W. Shin[1], N. Izu[1], M. Nishibori[1]; [1]National Institute of Advanced Industrial Science and Technology, Japan, [2]Toyama Industrial Technology Center, Japan

S15-P006 Colorimetric Detection of Metal Ion Using Various Polymers Capped Gold Nanoparticles
J. Roh, Y. Kim; Kwangwoon University, Korea

S15-P007 Amino Acid Mediated Solvothermal Synthesis of Oxide Nanostructures for Gas Sensor Applications
K.-I. Choi, H.-R. Kim, K.-M. Kim, J.-H. Lee; Korea University, Korea

S15-P008 Thickness Dependence of Sensing Performances of SnO_2 Thin Films Prepared by Pulsed Laser Deposition
T. Ohgaki[1], R. Matsuoka[1,2], K. Watanabe[1], K. Matsumoto[1,2], Y. Adachi[1], I. Sakaguchi[1], S. Hishita[1], N. Ohashi[1,2], H. Haneda[1,2]; [1]National Institute for Materials Science, Japan, [2]Kyushu University, Japan

S15-P009 Parallel Observation of Different Biomolecular Recognition Events using a Multi-functional SAM Microarray
N. Shirahata[1,2], Y. Masuda[3], A. Hozumi[3], Y. Sakka[1]; [1]National Institute for Materials Science, Japan, [2]PRESTO-Japan Science and Technology Agency, [3]National Institute of Advanced Industrial Science and Technology, Japan

S15-P010 XAFS and XPS Characterizations of Au/Co_3O_4 CO Combustion Catalyst Integrated on Micro Gas Sensor
M. Nishibori, W. Shin, N. Izu, T. Itoh, I. Matsubara; National Institute of Advanced Industrial Science and Technology, Japan

S15-P011 Solution Synthesis of Various ZnO Nanostructures for Gas Sensor Applications
K.-M. Kim, H.-R. Kim, K.-I. Choi, H.-J. Kim, J.-H. Lee; Korea University, Korea

S15-P012 Development of Ceramics Oxygen Sensor for Material Irradiation Tests
S. Kitagishi, T. Saito, M. Ohmi, K. Tsuchiya; Japan Atomic Energy Agency, Japan

S15-P013 Solvothermal Synthesis of ZnO Spherical Particles and Gas Sensor Apprication
N. Saito[1], K. Matsumoto[1], K. Watanabe[1], T. Aubert[2], H. Haneda[1]; [1]National Institure for Materials Science, Japan, [2]Université de Rennes 1, France

S15-P014 Properties of La-based Perovskite-Type Oxides as Electrode Catalyst for Zirconia Based NOx Sensor
S. Takahashi[1,2], M. Umeda[2], H. Okawa[1], T. Ueda[1]; [1]Japan Fine Ceramics Center, Japan, [2]Daido University, Japan

S15-P015 Fe_2O_3 Hollow Spheres Prepared by Solvothermal Self Assembly Reaction and its Gas Sensing Characterisics
H.-J. Kim[1], H.-R. Kim[1], K.-I. Choi[1], K.-M. Kim[1], G. Cao[2], J.-H. Lee[1]; [1]Korea University, Korea, [2]University of Washington, USA

S15-P016 Microwave-Assisted Hydrothermal Synthesis and Characterization of Hausmannite Type Manganese Oxide
C. X. Cardoso[1], S. R. Teixeira[1,2], L. S. Watanabe[1], M. F. S. Teixeira[1], E. Longo[1,2]; [1]Universidade Estadual Paulista "Julio de Mesquita Filho", Brazil, [2]Instituto Nacional de Ciência e Tecnologia dos Materiais em Nanotecnologia, Brazil

S15-P017 Oxygen Tracer Diffusion through Rreduced-$BaTiO_3$ Ceramics
K. Watanabe, I. Sakaguchi, S. Hishita, N. Ohashi, H. Haneda; National Institute for Materials Science, Japan

S15-P018 Oxygen Diffusion Paths in Non-doped $BaTiO_3$ Ceramics
I. Sakaguchi, K. Watanabe, T. Ohgaki, Y. Adachi, S. Hishita, N. Ohashi, H. Haneda; National Institute for Materials Science, Japan

S15-P019 Optimization of an LSAM Electroceramic for Use in an Oxygen Sensor
K. E. Pappacena, D. Singh, J. L. Routbort; Argonne National Laboratory, USA

S15-P020 Mechanoluminescent Film Sensor for Visualizing Ultrasonic Power Distribution
T. Zhan[1], C.-N. Xu[1,2,3], O. Fukuda[2], H. Yamada[1,2], C. Li[2]; [1]Kyushu University, Japan, [2]National Institute of Advanced Industrial Science and Technology, Japan, [3]Japan Science and Technology Agency, Japan

S15-P021 Near Infra-Red Mechanoluminescence from Strontium Alminate Doped with Rare-Earth Ions
Y. Terasawa[1], C.-N. Xu[1,2,3], H. Yamada[1,2], M. Kubo[2]; [1]Kyushu University, Japan, [2]National Institute of Advanced Industrial Science and Technology, Japan, [3]Japan Science and Technology Agency, Japan

S15-P022 Implementation of Simple Statistical Pattern Recognition Methods for Malodor Classification Using Gas Sensor Array
H.-G. Byun[1], J.-S. Shin[1], W.-S. Choi[2], S.-D. Kim[2]; [1]Kangwon National University, Korea, [2]Auto Industrail Co., Korea