

Web of Science

Search

Search Results

My Tools ▾

Search History

Marked List

3 of 752

NCBI

 Look Up Full Text


Save to EndNote online ▾

Add to Marked List

Highly Selective Xylene Sensor Based on NiO/NiMoO₄ Nanocomposite Hierarchical Spheres for Indoor Air Monitoring

By: Kim, BY (Kim, Bo-Young)^[1]; Ahn, JH (Ahn, Jee Hyun)^[1]; Yoon, JW (Yoon, Ji-Wook)^[1]; Lee, CS (Lee, Chul-Soon)^[1]; Kang, YC (Kang, Yun Chan)^[1]; Abdel-Hady, F (Abdel-Hady, Faissal)^[2]; Wazzan, AA (Wazzan, Abdulaziz A.)^[2]; Lee, JH (Lee, Jong-Heun)^[1,2]

[View ResearcherID and ORCID](#)

ACS APPLIED MATERIALS & INTERFACES

Volume: 8 Issue: 50 Pages: 34603-34611

DOI: 10.1021/acsami.6b13930

Published: DEC 21 2016

[View Journal Impact](#)

Abstract

Xylene is a hazardous volatile organic compound, which should be measured precisely for monitoring of indoor air quality. The selective detection of ppm-level xylene using oxide semiconductor chemiresistors, however, remains a challenging issue. In this study, NiO/NiMoO₄ nanocomposite hierarchical spheres assembled from nanosheets were prepared by hydrothermal reaction, and the potential of sensors composed of these nanocomposites to selectively detect xylene gas was investigated. The sensors based on the NiO/NiMoO₄ nanocomposite hierarchical spheres exhibited high responses (maximum resistance ratio =101.5) to 5 ppm p-xylene with low cross-responses (resistance ratios <30) to 5 ppm toluene, benzene, C₂H₅OH, CH₃COCH₃, HCHO, CO, trimethylamine, and NH₃. In contrast, a sensor based on pure NiO hierarchical spheres exhibited negligibly low responses to all 9 analyte gases. The gas-sensing mechanism underlying the high selectivity and response to xylene in the NiO/NiMoO₄ nanocomposite hierarchical spheres is discussed in relation to the catalytic promotion of the xylene-sensing reaction by synergistic combination between NiO and NiMoO₄, gas-accessible hierarchical morphology, and electronic sensitization by Mo addition. Highly selective detection of xylene can pave the road toward a new solution for precise monitoring of indoor air pollution.

Keywords

Author Keywords: NiO; NiMoO₄; hierarchical structures; selective gas sensor; xylene

KeyWords Plus: GAS-SENSING PROPERTIES; ZNO NANOWIRE NETWORKS; NICKEL MOLYBDATE; OXIDATIVE DEHYDROGENATION; CATALYTIC-OXIDATION; MALEIC-ANHYDRIDE; C-4 HYDROCARBONS; EXCESS MOO₃; NANOSTRUCTURES; OXIDE

Author Information

Reprint Address: Lee, JH (reprint author)

 Korea Univ, Dept Mat Sci & Engn, Seoul 02841, South Korea.

Reprint Address: Lee, JH (reprint author)

 King Abdulaziz Univ, Dept Chem & Mat Engn, Jeddah 21589, Saudi Arabia.

Organization-Enhanced Name(s)

King Abdulaziz University

Addresses:

 [1] Korea Univ, Dept Mat Sci & Engn, Seoul 02841, South Korea

Citation Network

2 Times Cited

61 Cited References

[View Related Records](#)

 [Create Citation Alert](#)

(data from Web of Science Core Collection)

All Times Cited Counts

2 in All Databases

2 in Web of Science Core Collection

0 in BIOSIS Citation Index

0 in Chinese Science Citation Database

0 in Data Citation Index

0 in Russian Science Citation Index

0 in SciELO Citation Index

Usage Count

Last 180 Days: 60

Since 2013: 63

[Learn more](#)

Most Recent Citation

Xu, Keng. [Single-crystalline porous nanosheets assembled hierarchical Co₃O₄ microspheres for enhanced gas-sensing properties to trace xylene](#). SENSORS AND ACTUATORS B-CHEMICAL, JUL 2017.

[View All](#)

This record is from:

Web of Science Core Collection
- Science Citation Index Expanded

Suggest a correction

If you would like to improve the quality of the data in this record, please [suggest a correction](#).

[-] [2] King Abdulaziz Univ, Dept Chem & Mat Engr, Jeddah 21589, Saudi Arabia

Organization-Enhanced Name(s)

King Abdulaziz University

E-mail Addresses: jongheun@korea.ac.kr

Funding

Funding Agency	Grant Number
National Research Foundation of Korea (NRF)	
Korean government (Ministry of Education, Science, and Technology (MEST))	2016R1A2A1A05005331

[View funding text](#)

Publisher

AMER CHEMICAL SOC, 1155 16TH ST, NW, WASHINGTON, DC 20036 USA

Categories / Classification

Research Areas: Science & Technology - Other Topics; Materials Science

Web of Science Categories: Nanoscience & Nanotechnology; Materials Science, Multidisciplinary

Document Information

Document Type: Article

Language: English

Accession Number: WOS:000390728900052

PubMed ID: 27936552

ISSN: 1944-8244

Journal Information

Table of Contents: [Current Contents Connect](#)

Impact Factor: [Journal Citation Reports](#)

Other Information

IDS Number: EGONG

Cited References in Web of Science Core Collection: 61

Times Cited in Web of Science Core Collection: 2