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Muhammad Alizada

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Home: Khatai Ganja street 59 , AZ1126 Baku (Azerbaijan)

WORK EXPERIENCE

Internship
AZTELECOM MMC [01/07/2017 – 31/08/2017]

Address: Tbilisi avenue, Baku (Azerbaijan)
Website: www.aztelekom.az

Electronic Engineer
Institute of Physics Azerbaijan National Academy of Sciences [21/09/2019 – Current]

Address: Baku H.Cavid street, 131, AZ1143 Baku (Azerbaijan)
Website: www.science.gov.az

Laboratory assistant
Khazar University [01/02/2022 – Current]

Address: 41 Mehseti Street, AZ1096 Baku (Azerbaijan)
Website: https://khazar.org
Name of unit or department: Physics and Electronics department - **Business or sector:** Education

EDUCATION AND TRAINING

Diploma of Secondary Education
[15/09/2003 – 15/09/2014]

Address: Telnov St, Baku, Baku (Azerbaijan)
Website: https://bakimektebleri.edu.az/27/

Diploma of Bachelor's Degree - Electronics,Telecommunications and Radio Engineering
Khazar University [15/09/2014 – 09/09/2018]

Address: 11 Mahsati Ganjavi Rd, Baku, AZ1096 Baku (Azerbaijan)
Website: www.khazar.org

Diploma of Master's Degree - Electronics and communication engineering
Kocaeli University [31/01/2021 – Current]

Address: Kocaeli İzmit Umuttepe Campus, İzmit (Türkiye)
Website: http://www.kocaeli.edu.tr/

LANGUAGE SKILLS

Mother tongue(s): **Azerbaijani**

Other language(s):

Turkish

LISTENING C1 **READING** C1 **WRITING** B2

SPOKEN PRODUCTION B2 **SPOKEN INTERACTION** B2

English

LISTENING B1 **READING** B2 **WRITING** B1

SPOKEN PRODUCTION B1 **SPOKEN INTERACTION** B1

Levels: A1 and A2: Basic user; B1 and B2: Independent user; C1 and C2: Proficient user

DIGITAL SKILLS

Microsoft Office / Proteus / Matlab/Simulik / C++ / NI-MultiSim / Origin software (data processing and analysys) / MPLAB X IDE Microchip tecnology / Microcontroller: ARM STM32 / Arduino Mega, Node MCU, Raspberry Pi / PLC (Basic Knowledge)

PUBLICATIONS

Detection of Nitroaromatic Explosives in Air by Amino-Functionalized Carbon Nanotubes

[2022]

IF 5.71 (Nanomaterials, Web of Science/Q1)

In this study, amino-functionalized carbon nanotubes were used to produce resistive sensors to detect nitroaromatic explosives by interaction with their vapors. Devices formed by carbon nanotube networks working at room temperature revealed trinitrotoluene, one of the most common nitroaromatic explosives, and di-nitrotoluene-saturated vapors, with reaction and recovery times of a few and tens of seconds, respectively. This type of resistive device is particularly simple and may be easily combined with low-power electronics for preparing portable devices.

Enhancement effect of Ni and NiO on gas sensing characteristics of carbon nanotube based structures

[2023]

IF 2.3 (Fullerenes, Nanotubes and Carbon Nanostructures, Web of Science and Scopus/Q2)

In the presented work, the effect of nickel (Ni) and nickel oxide (NiO) nanoparticles on the sensing properties of multi-walled carbon nanotubes (MWCNTs) was studied. The sensor structure, developed on the basis of MWCNTs functionalized with oxygen containing groups, shows 10% sensitivity to nitrogen dioxide (NO_2 gas) within 30 s, and the resistance increases under the influence of both oxidizing (NO_2) and reducing (NH_3) gases. However, after the decoration of the functionalized MWCNTs f-MWCNTs with Ni and NiO their sensing response to NO_2 gas at room temperature were recorded 60% (within 20 s) and 107% (within 7 s), respectively and the selectivity was improved many times. The sensing mechanisms of the fabricated f-MWCNTs/Ni and f-MWCNTs/NiO-based sensor structures were explained from physical and chemical viewpoints. It was determined that both Ni and NiO play catalytic roles in the sensing processes of the fabricated f-MWCNTs/Ni and f-MWCNTs/NiO-based sensor structures.

Highly Selective Detection of Hydrogen Sulfide by Simple Cu-CNTs Nanocomposites

[2023]

IF 4.1 (C - Journal of Carbon Research, Web of Science and Scopus)

The presented work is devoted to the preparation of nanocomposites based on multiwall carbon nanotubes (MWCNTs) and copper (Cu) nanoparticles by a simple chemical method, and to study their sensing properties to hydrogen sulfide (H_2S) gas. The Cu decorated multiwall carbon nanotubes (MWCNTs/Cu) were prepared by the deposition of very thin Cu layers on the pristine and functionalized multiwall carbon nanotubes (f-MWCNTs) using both physical (electron beam evaporation (EBE)) and chemical (electrochemical deposition) methods. MWCNTs/Cu prepared in the two above-mentioned ways, their sensing properties were studied, and the results were comparatively analyzed. The effect of the chemical functionalization of MWCNTs by oxygen-containing groups on the sensing properties of these f-MWCNT/Cu nanocomposites has been investigated. All the prepared sensors demonstrated high sensitivity and selectivity to H_2S in the air at room temperature. The f-MWCNT/Cu structure obtained by the chemical method demonstrated about 5 times (~400%) higher sensitivity ($\Delta R/R_0$) to H_2S gas compared to the similar structure obtained by the physical method. The temperature effect on sensory characteristics (response and self-recovery time) of the f-MWCNTs/Cu structure was also studied.

PID and Fuzzy Logic Control of Ball and Beam System Using Particle Swarm Optimization

[2023]

IF 0.8 (World Journal of Engineering and Technology)

In this research, we carried out the modeling of the ball and beam system (BBS) within the MATLAB/Simulink framework by applying both proportional-integral-derivative (PID) and fuzzy logic control strategies to govern the dynamics of this constructed model. The underlying non-linear dynamic equations adjusting the behavior of the BBS system are based on Newton's second law of motion. The physical installation of the BBS, designed for potential real-time application, comprises a lengthy beam subject to movement through the action of a DC servomotor, with a ball traversing the beam in a reciprocating manner. A distance sensor is strategically placed in front of the beam to determine the exact position of the ball. In this system, an electrical control signal applied to the DC servomotor causes the beam to pivot about its horizontal axis, thereby enabling the ball to move freely along the beam's length. To avoid the risk of losing the ball equilibrium on the beam and to achieve precise system control, a mathematical model was devised and implemented within the MATLAB/Simulink environment. The use of the particle swarm optimization (PSO) algorithm was aimed at tackling the task of refining and optimizing the PID controller specifically designed for the linearized ball and beam control system. The presented system is controlled using both PID and fuzzy logic, and the use of the PSO algorithm enhances the system's responsiveness efficiency.

CONFERENCES AND SEMINARS

INTERNATIONAL CONGRESS OF MARMARA SCIENCES-IMASCON CONGRESS

[Kocaeli University, Kocaeli, Turkey, 21/05/2021 – 22/05/2021]

MONITORING AND CONTROL OF SENSORS WITH SMART PHONE - With the developed device, the sensor data on the device is monitored in real time via the mobile application connected to the network.

2nd INTERNATIONAL CONFERENCE ON LIGHT AND LIGHT-BASED TECHNOLOGIES

[Gazi University, Ankara, Turkey, 26/05/2021 – 28/05/2021]

Development of sensors based on functionalized carbon nanotubes.

5th International Webinar on Materials Science & Engineering

[Greenville,SC 29607, USA, 04/04/2022 – 05/04/2022]

Highly selective detection of hydrogen sulfide Cu-CNTs nanocomposite.

Second International Bilateral Workshop on Science between Dokuz Eylül University and Azerbaijan National Academy of Science

[35390 Buca/ İzmir, 17/11/2022 – 18/11/2022]

Detection of Toxic Gases by remote Controlled multi-sensor system

AJP Physics section C: Conference

[H.A.Aliyev, Baku, Azerbaijan, 2023]

Synthesis optimization and characterization of Fe oxide nanoparticles

Mercure Paris CDG Airport & Convention

[Paris, France, 21/09/2023 – 22/09/2023]

Multi-sensor system for remote detection of toxic gases

PROJECTS

GSM module gas sensor mobile phone call alert

[23/10/2017 – 14/03/2018]

I won the Startup Competition organized by Khazar University on March 14, 2018. This product is controlled by a microcontroller and the gas sensor in the system is sensitive to gas leaks. If a gas leak is detected, it sends a notification to the mobile phone with the GSM module.

PORTABLE SENSORS FOR UNMANNED EXPLOSIVE DETECTION

[15/02/2018 – 15/08/2021]

Unmanned Aerial Vehicles(UAVs), and used to explore dangerous sites without direct human intervention. This technology could, for example, be applied in the surveillance of public environments for the detection of IEDs(Improvised Explosive Devices) using a wireless sensor network. The ultimate purpose of this project, in line with the SPS Key Priority of Counter-Terrorism, is the development of a complete sensor weighing less than 500 grams, including the wireless communication system, suitable for transportation by a drone.

SOCAR, ET No:25LR- ANAS portable multi-gas analyzer

[05/01/2022 – 05/01/2023]

A portable multi-gas analyzer was developed for monitoring the oil and gas industrial facility.

JOB-RELATED SKILLS

Job-related skills

- Multitasking
- Problem-identification and resolution
- Maintaining an orderly work environment

COMMUNICATION AND INTERPERSONAL SKILLS

Communication and interpersonal skills

Tolerance and respect for team members

Listening well

Empathy for others

Patience when dealing with others

Collaborating and working together well