RegID: 10237

CERTIFICATE OF PARTICIPATION

This is to certify that

Noubeil Guermat

has participated as **"Poster Presenter"** and presented the following paper entitled:

Impact of Fluorine Doping on the Structural, Optical and Electrical Characteristics of Spray Deposited SnO2 Thin Films

INTERNATIONAL CONFERENCE ON APPLIED ANALYSIS AND MATHEMATICAL MODELING, 2024

held on July 19-23, 2024
Biruni University
Istanbul-Turkey

Prof. Dr. Mustafa Bayram
Chairman

BİRUNİ UNIVERSITY

12th INTERNATIONAL CONFERENCE ON APPLIED ANALYSIS AND MATHEMATICAL MODELING (ICAAMM24)

Abstract Book

July 19-23, 2024,

Istanbul-Turkey

Abstracts Book

Editors
Mustafa Bayram
Aydın Seçer

12th INTERNATIONAL CONFERENCE ON APPLIED ANALYSIS AND MATHEMATICAL MODELING (ICAAMM24) Abstract Book, July 19-23, 2024, Istanbul-Turkey

Abstracts Book

Prof. Dr. Mustafa Bayram
Prof. Dr. Aydın Seçer

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Participant Statistics

230 participants from 29 different countries attended the conference, 28 of them from Turkey and the others from abroad, so 88% participants are foreigners and 12% participants are Turkish.

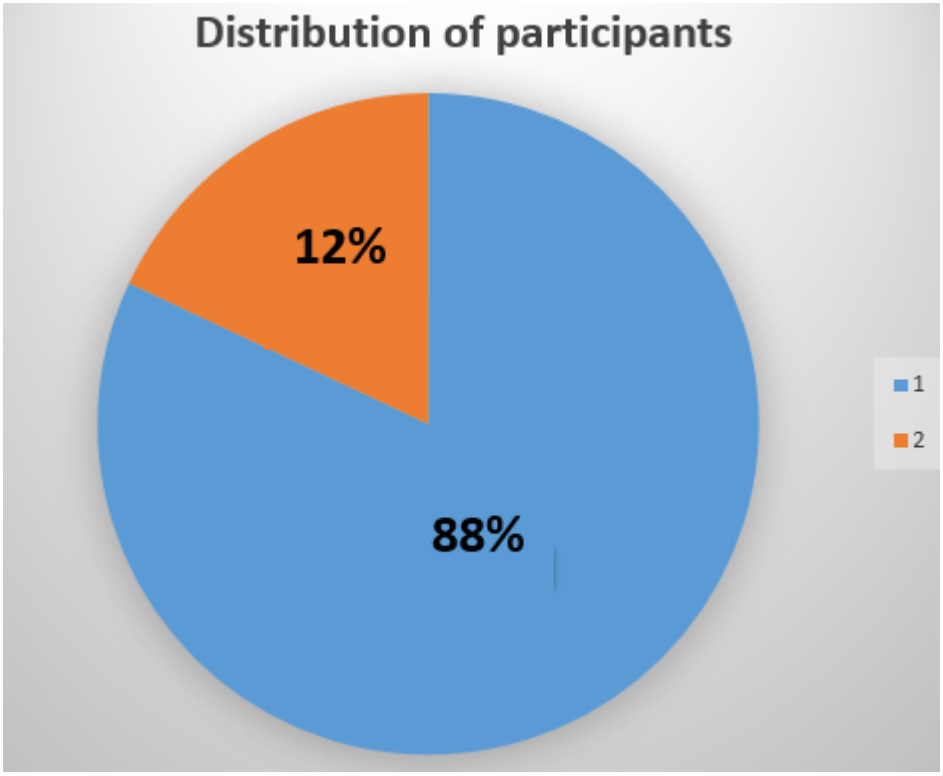

Figure 1: 1. Foreign participants, 2. Turkish participants

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MESSAGE FROM CHAIRMAN

It was with great pleasure that we welcomed you to the "12th International Conference On Applied Analysis And Mathematical Modeling. This conference, which took place in Istanbul, Turkey from July 19-23, 2024, was a hybrid event presented by Biruni University. With a significant turnout of scientists from 29 countries and a total of 230 papers presented, we gathered to discuss the most recent developments, discoveries, and progress in Applied Analysis.

We aimed to delve into the fundamental and frontier theories that act as the backbone of modern science and technology. We hoped to instigate further research interest and explorations into this exciting field. The conference placed a spotlight on the foundational theories and principles, analytical and symbolic approaches, and computational techniques in nonlinear physical science and mathematics. A diverse range of topics was addressed, from nonlinear dynamical systems, nonlinear electronic circuits, and classical and fractional differential equations to nonlinear dynamics in fields such as biology and engineering. We also explored complexity in areas like physics, chemistry, and biomedicine, neurodynamics, social dynamics, data-driven dynamical systems, and mathematical methods in artificial intelligence, among others.

As the number of applications from around the world increased, we faced the challenging task of selecting and categorizing abstracts from numerous participants. We did our utmost to accommodate a wide range of speakers, creating an environment conducive to rich, engaging interactions and exchanges.

We were also delighted to offer a range of social activities including an excursion boat trip and a city tour, providing an excellent opportunity for participants to engage in informal discussions and networking. We were particularly heartened by the robust participation from young researchers, whose presentations contributed significantly to the conference.

The talks covered a wide range of mathematics and its applications such as analysis, algebra, statistics, computer mathematics, discrete mathematics, geometry, and engineering, as well as their use in modeling. We believed that this richness provided the basis for interdisciplinary collaborations.

We want to express our sincere thanks to some key individuals who contributed significantly to the conference's success. Aydin Secer and Dumitru Baleanu, your participation and efforts were truly appreciated. The same goes for Ali Akgul, Yeliz Karaca, Tuğçem Partal, Neslihan Ozdemir, Melih Cinar, Handenur Esen, and Ismail Onder, along with all our colleagues who worked tirelessly for the organization of the conference. In addition, we acknowledged the support and guidance of the chairman of the board of trustees of Biruni University and Prof. Dr. Adnan Yüksel, the Rector of Biruni University, our host institution. We were also grateful to all the plenary speakers who kindly accepted our invitation and dedicated their time to sharing their ideas during the conference.

Our heartfelt appreciation extended to all members of the organizing committee. If any individual or contribution has been unintentionally overlooked or forgotten, we hope for their kind understanding. We sincerely thanked all who put their effort into making this occasion possible.

We were delighted to welcome each and every one of you to this conference. We hope it was an enjoyable and productive experience and look forward to meeting again on future occasions.

Sincerely Yours,
Prof. Dr. Mustafa Bayram,
Conference Chair

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Mahmoud Abdel-Aty, Sohag University, Egypt
Mustafa Bayram, Biruni University, Turkey
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George Anastassiou, USA
Dumitru Baleanu , Lebanon
Mahmoud Abdel-Aty, Egypt
Jamal-Odysseas Maaita, Greece
Juan R. Torregrosa, Spain

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Ali Akgul, Turkey
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Yeliz Karaca, USA
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Impact of Fluorine Doping on the Structural, Optical and Electrical Characteristics of Spray Deposited SnO2 Thin Films

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Abstract: In this study, we conducted a thorough analysis of the impact of fluorine doping at concentrations of 2%, 4%, and 6% on the structural, optical, and electrical characteristics of undoped SnO_2 films deposited using the spray pyrolysis technique. Various analytical methods were employed to assess these properties: X-ray diffraction (XRD) for structural examination, UV-visible spectrophotometry for optical evaluations, and the four-point probe method for electrical measurements. The XRD analysis revealed that the films deposited via spray pyrolysis exhibited a polycrystalline structure with a tetragonal rutile-type phase [1-4]. The pure SnO_2 and SnO_2:2%F films displayed a preferential orientation along the (110) plane, as indicated by the peak at $2\theta = 26.84°$. However, the films doped with 4%F and 6%F showed a change in orientation from (110) to (200). The addition of fluorine dopant resulted in increased transmittance, reaching a maximum of 83% for the SnO_2:6%F film. Electrical analysis demonstrated that fluorine doping enhanced the electrical resistivity of the pure SnO_2 film deposited via spray pyrolysis, achieving a low resistivity value of 7.11×10^{-2} Ω·cm. Based on these findings, it can be concluded that SnO_2:6%F holds potential for use as a conductive transparent electrode in thin-film solar cells.

Keywords: Thin films, F-doped SnO_2, Spray pyrolysis, XRD, Electrical resistivity.

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