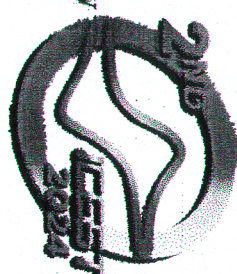


Setif 1 University - Ferhat ABBAS, ALGERIA  
Faculty of Technology  
Department of Processes Engineering  
The Second International Conference on Electrochemical Sciences and Technology



## *Certificate of Participation "ICEST 2024"*

This is to certify that

**Belkacem NESSARK**

has successfully participated in the

*The 2<sup>nd</sup> International Conference on Electrochemical, Sciences and Technology (ICEST 2024)*

*Held from May 7 to 9, 2024, at Setif1 University-Ferhat ABBAS, Algeria.*

With a poster entitled

Synthesis, characterization and analysis of the electrochemical and morphological properties of composite materials POC/SC - use as materials for the design of photovoltaic cells, biosensors, electronic components.

Co-authors: L. Lamiri, F. Nessark, N. Harfouche, F. Habelhames, A. Bahloul, N. Maouche

*Scientific committee Chair*

*Pr. Ahmed ZOUGOU*



*Organizing committee Chair*

*Dr. Nadjib CHAFAI*



**Synthesis, characterization and analysis of the electrochemical and morphological properties of composite materials POC/SC - use as materials for the design of photovoltaic cells, biosensors, electronic components.**

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**Abstract:**

This work deals with the synthesis of new composite materials obtained from conducting polymers (POC) derived from the monomer: terthiophene, bithiophene, pyrrole or aniline, modified by the incorporation of semiconductor oxides (SC) ( $\text{TiO}_2$ ,  $\text{MnO}_2$ , and  $\text{LiMn}_2\text{O}_4$ ). The study concerns the analysis of electrochemical and electronic properties of these composites, in order to test their performance and use as electrode materials in electrochemical and electronic applications (batteries, biosensors, super capacitors, field effect transistors), and in the conversion and storage of energy (solar cells). These composite materials are obtained by electropolymerization of the monomer in the presence of semiconductor on the electrode (Pt, Cv, ITO). Then, they are characterized by cyclic voltammetry, electrochemical impedance spectroscopy, UV-Vis, SEM, EDX and electronic methods.

Thus, the study shows the anodic and cathodic peaks that are characteristic of their oxidation and reduction. Electrochemical impedance spectroscopy shows arcs at high frequencies, followed by a straight line at low frequencies, which are respectively characteristic process of charge transfer and diffusion. This study also shows that the optical, morphological, electrical properties vary with the synthesis method, the concentration and the nature of the monomer and the dopant semiconductor used. The results show that increasing the content of dopant in the composite material improves electrochemical and electronic properties of the material that makes possible their use as electrode materials in various electrochemical and electronic applications.

**Key words:** Composite materials, dopant, semiconductor oxide, cyclic voltammetry, electrochemical impedance spectroscopy.