

# ATTESTATION DE PARTICIPATION



ID: SIEER/2025-143

*Le comité d'organisation du Séminaire International sur l'Energétique et les Energies*

*Renouvelables (SIEER 2025) atteste que :*

**Siassi Abderrahim**

*A Présenté une communication Poster intitulée :*

**Studying the structural and optical properties of manganese oxide nanoparticles fabricated via sol-gel**

**Co- Auteur (s) : Rabie AMARI, Abdelhalim KAHOUL, Bahri DEGHEFEL, Noudjoud LEBGAA,**

**Salim DAOUDI**

Président du SIEER 2025

مدير مخبر الفيزياء الطاقوية المتجددة  
الأستاذ الدكتور سوادني عبد المدين

Pr A. SOUDANI

SIEER-2025, LE 22 ET 23 AVRIL 2025, BATNA



# Studying the structural and optical properties of manganese oxide nanoparticles fabricated via sol-gel

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## Abstract

In this study, manganese oxide thin films were synthesized via the sol-gel spin coating technique. Among the various reported methods in the literature, our approach employed manganese acetate tetrahydrate ((CH<sub>3</sub>COO)<sub>2</sub>Mn·4H<sub>2</sub>O) and monoethanolamine (MEA, NH<sub>2</sub>CH<sub>2</sub>CH<sub>2</sub>OH) as precursors, using ethanol as the solvent. Initially, a predetermined amount of manganese acetate tetrahydrate was dissolved in ethanol, followed by the addition of MEA in a 1:1 molar ratio relative to Mn. The solution was then stirred for 1.5 hours at 60 °C. Afterward, it was deposited on a glass substrate by spin coating at 2000 rpm for 30 seconds, followed by calcination at 450 °C. Optical characterization revealed that the resulting thin film exhibited an indirect band gap of 2.36 eV. Furthermore, X-ray diffraction (XRD) analysis confirmed the formation of the cubic Mn<sub>2</sub>O<sub>3</sub> phase in the sample.

**Keywords:** Manganese oxide; DRX; sol gel; spin coating.

## References

- [1] L. Cheng et al., 'Crystal facet-dependent reactivity of  $\alpha$ -Mn<sub>2</sub>O<sub>3</sub> microcrystalline catalyst for soot combustion', *Appl. Catal. B Environ.*, vol. 204, pp. 374–384, May 2017, doi: 10.1016/j.apcatb.2016.11.041.
- [2] A. K. Singh, T. K. Dhiman, L. G. B. V.S., and P. R. Solanki, 'Dimanganese trioxide (Mn<sub>2</sub>O<sub>3</sub>) based label-free electrochemical biosensor for detection of Aflatoxin-B1', *Bioelectrochemistry*, vol. 137, p. 107684, Feb. 2021, doi: 10.1016/j.bioelechem.2020.107684.

*REPUBLIQUE ALGERIENNE DEMOCRATIQUE ET POPULAIRE  
Ministère de l'Enseignement Supérieur et de la Recherche Scientifique  
Université de Batna 1 – Faculté des Sciences de la Matière*



# Programme du séminaire SIEER 2025



**Séminaire International sur l'énergétique et les énergies renouvelables**

**Président du séminaire**

Pr Azeddine SOUDANI

# Mardi 22 avril 2025

## Enregistrement

A partir de 08h :00

Auditorium de l'Université

## Cérémonie d'ouverture

08h :30 – 09h :00

Auditorium de l'Université

## 1<sup>ère</sup> Conférence plénière

09h :00 – 10h :00

Auditorium de l'Université

## Hydrogen fuel : Technology and Applications

### Professeur Khadidja SAFER

Laboratoire des Carburants Gazeux et de l'Environnement,  
Faculté de Génie Mécanique, Université des Sciences et de la Technologie d'Oran Mohamed Boudiaf

## 2<sup>ème</sup> Conférence plénière

10h :00 – 11h :00

Auditorium de l'Université

## Kuwait's Renewable Energy Projects. Experience and Insights for Algeria

### Professeur Mabrouk ADOUANE

Associate Research Scientist, Renewable Energy & Energy Efficiency Program  
Energy and Building Research Center. Kuwait Institute for Scientific Research

## Pause-café

11h :00 – 11h :15

Auditorium de l'Université

## 3<sup>ème</sup> Conférence plénière

11h :15 – 12h :30

Auditorium de l'Université

## Optimisation des Échanges Thermiques par Simulation Numérique : Utilisation de Structures Lattices Issues de la Fabrication Additive pour le Stockage d'Hydrogène

### Professeur Nadhir LEBBAL

Professeur agrégé, Université de Technologie de Belfort-Montbéliard France

## Déjeuner

12h :30 – 13h :30

Salle de la bibliothèque de la  
Faculté des Sciences de la Matière.

## Communications orales/ Session 1

13h :30 – 16h :00

Salle des soutenances de la Faculté  
des Sciences de la Matière.

Président : Pr Siham DJOUMAA / Dr Laid MESSAOUDI

13h :30 – 13h :45	Numerical study on heat transfer with mixed convection in the Rotated system	CHAIEB Ismahane
13h :45– 14h :00	Natural convection with heat generation in an anisotropic porous cavity with nanofluid saturation	Safi Safia
14h :00 – 14h :15	Écoulement d'un fluide à seuil dans une conduite avec singularité	Trea Imane
14h :15 – 14h :30	Flow in a three-sided lid-driven cavity: parallel upward motion	Azzouz El Amin
14h :30 – 14h :45	Etude Expérimentale du Coefficient de Frottement d'un Echangeur de Chaleur Sinusoïdal en Forme S	Cheriet Kamel
14h :45 – 15h :00	Étude de la Stabilité Linéaire des Ondes Interfaciales à Courtes Crêtes de Gravité – Capillarité	Chikhi Sara
15h :00 – 15h :15	Convection laminaire mixte dans une cavité carrée avec une source de chaleur placer sur la partie basse avec les parois latérales amovibles	Zemmouri Fatima
15h :15 – 15h :30	Mixed Convection inside a Lid-Driven Quadrantal Porous Cavity Heated from the Bottom.	Brahmi Chihabeddine
15h :30 – 15h :45	Optimization of Flow in Water Treatment Reactors: CFD Approach and Turbulence Models	Merrouchi Farida
15h :45 – 16h :00	Effects of Substrate and Fluid Properties on the Evaporation and Rupture of Liquid Bridges	Dourari Abderrahmane

13h :30 – 16h :00

Amphi 150 A de la Faculté des  
Sciences de la Matière.

Président : Pr Zeroual AOUACHRIA / Pr MAAMERI abdelbaki

13h :30 – 13h :45	Mixed Convection Heat Transfer Analysis In A Triangular Enclosure With Hybrid Nanofluid: Influence Of Heat Source Shape For Solar Panel Applications	Boubekeur Ghazi
13h :45– 14h :00	Simulation of Spiral Earth-Air Heat Exchanger Design for Cooling Applications in Laghouat's Climate	Merdassi Mustapha
14h :00 – 14h :15	Heat transfer and entropy generation examination in a parabolic trough collector combines square porous media and Cu-water nanofluid	Diafi Halla
14h :15 – 14h :30	Natural convection of MHD hybrid nanofluid (Fe <sub>3</sub> O <sub>4</sub> -MWCNT) in annular cavity fitted with fins: Numerical approach	Benkherbache Souad
14h :30 – 14h :45	Lattice Boltzmann simulation for the prediction of nanofluid flow and heat transfer inside an inclined square cavity	Bouamoud Benameur
14h :45 – 15h :00	Numerical study on dynamic-stall characteristics of wing	Bourekba Fatih
15h :00 – 15h :15	Laminar Flow and Entropy Generation of Hybrid Nanofluids within an Annular Duct: Effects of Magnetic Fields	Necib Nihal
15h :15 – 15h :30	Approche Comparative Des Modèles De Turbulence Pour Une Compréhension Approfondie Du Comportement Thermo-fluidique Dans Les Echangeurs De Chaleur A Tubes Et Calandre Avec Un Faisceaux Combines	Niou Slimane
15h :30 – 15h :45	Influence de la position des sources magnétiques sur l'intensification	Slimane Tich Tich

	des transferts thermiques et sur l'écoulement d'un fluide magnétique dans un mini-canal.	Mustapha
15h :45 – 16h :00	Numerical Simulation of the photovoltaic conversion performance of Back Contact Silicon Solar Cell	Tounsi Farouk

13h :30 – 16h :00

Amphi 150 B de la Faculté des Sciences de la Matière.

Président : Pr Benmachiche A/Hakim / Pr HadeF Ammar

13h :30 – 13h :45	Elimination of Acetamiprid from Wastewater with Low Cost Biochar	Diffallah Mebarka
13h :45– 14h :00	Numerical study of octagonal jet for the optimization of residential thermal comfort.	Kadi Hacene
14h :00 – 14h :15	The role of main thermal springs in Soumman region for sustainable development	Ait Ouali Abdelkader
14h :15 – 14h :30	Energy, Exergy and Economic Analysis of Ejector Compression Absorption Cascade Cycle Using Low GWP and ODP Refrigerants	Mebarki Billal
14h :30 – 14h :45	The ecological palm groves in El Oued, Algeria: A step forward for a balance between modern agriculture and the Ghout	Khebizi Hafidha
14h :45 – 15h :00	Étude Paramétrique et Réalisation d'une Éolienne	Djait Ahlam
15h :00 – 15h :15	Green construction as a strategy for achieving sustainable urban development	Chemani Wafa
15h :15 – 15h :30	Energy management and control of PV/Fuel cell/Battery Based hybrid system	Douak Mohamed
15h :30 – 15h :45	Performance analysis of an East-West Oriented PV System	Ghribi Eps DIAF Djamilia
15h :45 – 16h :00	Optimization of Hydrogen Production by Water Electrolysis Using Advanced Catalysts	Hizia Merkoune

13h :30 – 16h :00

Amphi 300 de la Faculté des Sciences de la Matière.

Président : Pr Khaldi Fouad / Dr Alioua Tarek

13h :30 – 13h :45	Contribution à l'amélioration de la qualité de l'énergie solaire intégrée dans le réseau électrique par le biais d'un filtre	Mazouz Farida
13h :45– 14h :00	Limitations and Constraints on Renewable Energy Transition with mention to the Case of Algeria	Touat Othmane
14h :00 – 14h :15	Modeling Algeria's Transport Energy System with OSeMOSYS: A Pathway to Sustainable Development (2022–2100)	Boulahbel Samira
14h :15 – 14h :30	La production de l'électricité à partir d'un système hybride PV-diesel pour l'électrification dans l'extrême sud de l'Algérie	Dahmani Souria
14h :30 – 14h :45	Green Liquid Hydrogen as a Sustainable Fuel in Rocket Propulsion	Bennaceur Mohamed Amine
14h :45 – 15h :00	Optimal Sizing of an Autonomous Hybrid Microgrid comprising Photovoltaics, Wind Turbines, Diesel Generators, and Battery Storage Using Ant Colony Optimization	Bouchaala Abdel Djabar
15h :00 – 15h :15	Optimisation des performances des cellules solaires à pérovskite (PSC)	Zeghiche Yasmina
15h :15 – 15h :30	Energy Management in Microgrids: A Robust MATLAB/Simulink Framework for Renewable Integration, System Optimization, and Sustainable Operations	Guebli Chakib
15h :30 – 15h :45	The Impact of Hydrogen Enrichment on Engine Performance and Exhaust Emissions in LPG-Hydrogen Blends	Ghodbane Hassina
15h :45 – 16h :00	Etude du comportement thermique d'un panneau radiant rafraichissant dans les différentes zones climatiques de l'Algérie	Mahmouche Wassiaa Farah

## Pause-café / Session poster

16h :00 – 16h :30

16h :00– 16h :30

Hall du RDC Faculté des Sciences de la Matière.

## Communications orales / Session 2

16h :30 – 18h :30

Salle des soutenances de la Faculté des Sciences de la Matière.

Président : Pr Aksas Mounir / Dr Belkacemi Zoubir

16h :30 – 16h :45	Effect of different forms of elliptically deformable blades on the efficiency of Savonius vertical axis wind turbine	Zereg Alaeddine
16h :45– 17h :00	Solar Cell Performance Through Plasma Treatment A Numerical Study Using MATLAB	Fadhel Sara
17h :00 – 17h :15	Ni and/or Fe based mono_ and bi-Hydroxydes for Energy Storage	Benaldjia Hana
17h :15 – 17h :30	Conception d'un Prototype d'arbre Solaire Photovoltaïque au sein du Pôle Universitaire de M'Sila	Salmi Mohamed
17h :30 – 17h :45	Numerical Simulation of the effect of pulling rate on heat transfer and interface shape of Al <sub>2</sub> O <sub>3</sub> single crystal	Azoui Hanane
17h :45 – 18h :00	Performance Study Of An Organic Rankine Cycle Using CO <sub>2</sub> -Based Mixtures As Working Fluid	Abdou Chaabane
18h :00 – 18h :15	Electrical characterization of ITO/GaAs Ohmic Contacts using TLM (Transfer Length	Boussoum Ouiza
18h :15 – 18h :30	Thermal Performance of PCM-Enhanced Building Envelopes Under Batna Climatic Conditions	Lehmil Sabrina

16h :30 – 18h :30

Amphi 150 A de la Faculté des Sciences de la Matière.

Président : Pr Demagh Yacine / Dr Nezzar Djemma

16h :30 – 16h :45	Simulation of photovoltaic panel using Psim software	Bounaghla Salaheddine
16h :45– 17h :00	Perspective of sustainable agriculture through geothermal energy in Algeria (Examples of pilot sites)	Ait Ouali Abdelkader
17h :00 – 17h :15	Winter Thermal Performance of Phase Change Materials (PCMs) in Building Envelopes Across Four Climate Zones in Algeria.	Goudjil Houssef
17h :15 – 17h :30	Enhanced Thermal Management of Electronic Chips Using Nanofluids: A Quantum Perspective	Bouzenada Tarek
17h :30 – 17h :45	Analyse microscopique et cristallographique par DRX et Raman de panneaux solaires dégradés en milieu désertique algérien.	Hachemi Nadir
17h :45 – 18h :00	Impact des Matériaux de Construction sur les Besoins Énergétiques des Bâtiments en Régions Désertiques: Étude de Cas à l'Université d'Adrar	Bada Abdelmalek
18h :00 – 18h :15	Advancing the development of lead free all-organic perovskite solar cells with optimization of planer and an N-type TCO-free inverted structure achieving 30% high	Bouladame Mohammed

	performance.	
18h :15 – 18h :30	Simulation of the Behavior of a PN Junction under Different Polarization Conditions	Bouzouaoui Yahia Zakarya

16h :30 – 18h :30

Amphi 150 B de la Faculté des Sciences de la Matière.

Président : Pr Bouras Fethi / Dr Ferahta Fatima Zohra

16h :30 – 16h :45	Comparative Study of Advanced MPPT Approaches for Solar Energy Optimization	Boudersa Khouloud
16h :45– 17h :00	Improved Electrochemical Properties of Biomass-Based Activated Carbon for Energy Storage Applications	Kaizra Salima
17h :00 – 17h :15	Electric Power Distribution Grid Optimization	Maatallah Sebaoui
17h :15 – 17h :30	Maximum Power Point Tracking for Fuel Cell coupled with battery energy storage	Boudersa Khouloud
17h :30 – 17h :45	Investigation of generating electricity and heating water using a new hybrid photovoltaic/thermal combined with solar collector	Bacha Issam Eddine
17h :45 – 18h :00	Efficient recovery of materials from end of life PV panel recycling	Anas Boussaa Sabiha
18h :00 – 18h :15	Control Strategies for 3-Level NPC Inverter-Based PV Systems: A Comparative Analysis of PI and PID Controllers in Boost and Direct Configuration	Kerrouche Mustapha
18h :15 – 18h :30	Impact des Stratégies de Gestion du Stockage dans un Système Hybride (PV /Diesel/Batterie) : Etude de Cas	Bouseba Louiza

16h :30 – 18h :30

Amphi 300 de la Faculté des Sciences de la Matière.

Président : Pr Maache Mouna / Dr Noui Samira

16h :30 – 16h :45	Silver Nanofluids: Preparation, Characterization, and Medical Applications	Maghchiche Abdelhak
16h :45– 17h :00	Amplifying Light Interference to Enhance Thermal Performance in Perforated Double-Pass Solar Air Collectors	Fouzi Guellai
17h :00 – 17h :15	A General Overview of the UNFC for Geothermal Energy Resources and Examples of Algeria's Geothermal Resources	Khebizi Hafidha
17h :15 – 17h :30	Advancing in Green Hydrogen Production: Investigating Flow Channel Designs in a Proton Exchange Membrane Electrolyzer	Boutaghane Ayoub
17h :30 – 17h :45	Design and analysis of quinoxaline derivatives as acceptors in organic solar cells: DFT/TD-DFT investigation	Kara zaitri Lamia
17h :45 – 18h :00	Structural, electronic, elastic, and magnetic study for CoFeVSb Quaternary Heusler alloy via ab-initio calculation	Meliani Kawther
18h :00 – 18h :15	Structural and Optical study of porous silicon film Infiltration by Erbium ions (Er <sup>3+</sup> )	Nasri Nihal
18h :15 – 18h :30	Effect of halogenation of polycyclic aromatic hydrocarbons on their HOMO-LUMO energy gaps and chemical reactivity: DFT study	Benalia Amina



# Mercredi 23 avril 2025

## 4<sup>ème</sup> Conférence plénière Visioconférence

09h :00 – 10h :00

Salle de soutenance de la Faculté des Sciences de la Matière

### How Concentrating Solar Thermal (CST) Energy Technologies Can Contribute to the Energy Transition

*Comment les technologies énergétiques solaires thermiques à concentration (CST) peuvent contribuer à la transition énergétique*

**Professeur Loreto Valenzuela Gutiérrez**

Unité de technologies solaires thermiques à concentration à focalisation linéaire

Plateforme Solaire d'Almería - CIEMAT

### Pause-café

10h :00 – 10h :30

Hall du RDC Faculté des Sciences de la Matière.

10h :30 – 13h :00

Salle des soutenances de la Faculté des Sciences de la Matière.

Président : Pr Siham DJOUIMAA / Dr Chennouf Nawal

10h :30 – 10h :45	Enhancing Microgrid Stability Through Fault Detection and Isolation Based on PMU assisted Protection Coordination	Tsebia Mohammed
10h :45– 11h :00	Improvement of heat transfer of a magnetic fluid flow in a minichannel subjected to an external magnetic field.	Rahmoune Imene
11h :00 – 11h :15	Synthesis and Comparative Study of New Merocyanine Dyes with Rhodanine-Based Acceptors for Dye-Sensitized Solar Cells	Hamana Haoua
11h :15 – 11h :30	Influence of Melt Optical Properties on Crystal Growth Quality in the Czochralski Proces	Bouzouaoui Yahia Zakarya
11h :30 – 11h :45	Phase change material melting enhancement through nanomaterials in a unique thermal storage system	Chabani INES
11h :45 – 12h :00	Direct Torque Control for Single-Stage Solar Pumping System Using Artificial Neural Network-Based Speed Reference Prediction with Six-Phase Induction Motor	M'hamed Sahnoun
12h :00 – 12h :15	Optical Investigation of Er <sup>3+</sup> and Tm <sup>3+</sup> Codoped CdF <sub>2</sub> Single Crystals for White Light Emission and Photovoltaic Efficiency Enhancement	Diaf Madjid
12h :15 – 12h :30	Experimental Validation of Primary and Secondary Control Strategies for Islanded Microgrids	Bouharchouche Abderrezzaq
12h :30 – 12h :45	Spectroscopic studies of BaF <sub>2</sub> and CdF <sub>2</sub> single crystals doped with rare earth ions (Tb <sup>3+</sup> , Er <sup>3+</sup> , Tm <sup>3+</sup> ) for a laser potentiality	Boubekri Hani
12h :45 – 13h :00	Propriétés physiques des fluoropérovskites à base d'aluminium pour les composés MAIF <sub>3</sub> (M=Zn et Hg)	Nassah Younes

10h :30 – 13h :00

Amphi 150 A de la Faculté des Sciences de la Matière.

Président : Dr Chine Adel / Dr Guerraiche Djemaa

10h :30 – 10h :45	Optimizing Solar Chimney performance with thermal storage and smart Monitoring	Imakhlaf Anis
10h :45– 11h :00	Neuromimetic Control of an Inverter for Improving Power Quality Under Distorted Voltages: Application to the Active Power Filter	Lahmadi Ouarda
11h :00 – 11h :15	Enhancing Charge Transport in Al-Doped ZnO Electron Transport Layers: Insights from SCAPS Simulation and Nyquist Analysis	Merzougui Lina
11h :15 – 11h :30	Enhanced Power-Sharing Performance of Three-Phase Paralleled VSIs in a Standalone MG Using MSOGI Virtual Impedance Control Scheme	Ait Hammouda Camelia
11h :30 – 11h :45	Thermal Pyrolysis Profile of Tomato Pomace and Hot Pepper Wastes: Evolution of Volatile Products and Gas Emissions	Bellal Mohamed Nazim
11h :45 – 12h :00	Enzyme-Enhanced CO <sub>2</sub> Capture in Carbonate Solution Using Hollow Fiber Membrane Contactors: A Novel Numerical Approach of Mass Transfer	Khelifi Mohamed Nadir
12h :00 – 12h :15	Influence of Boron Dopant Deactivation on Hydrogen Diffusion and Defect Passivation in Hydrogenated n+pp+ Polycrystalline Silicon Solar Cells	Ouldamer Roza
12h :15 – 12h :30	Le rôle de l'énergie solaire dans l'amélioration de l'efficacité énergétique des logements : étude de ses impacts environnementaux et économiques à travers des applications internationales	Titi Meriem hafidha
12h :30 – 12h :45	Réduction d'émission des gaz polluants par un système énergétique(hybride)	Farida Benslimane
12h :45 – 13h :00	Comparative Analysis of Empirical and Fuzzy Logic Models for Global Solar Radiation Estimation	Yhaiaoui Samah

10h :30 – 13h :00

Amphi 150 B de la Faculté des Sciences de la Matière.

Président : Pr Aouachria Zeroual / Pr Benmachiche A/Hakim

10h :30 – 10h :45	Optimization of control parameters of a laminar boundary layer around a two-dimensional profile by suction	Nahoui Azzedine
10h :45– 11h :00	Grey Wolf Optimization-based MPPT technique for standalone PV System	Hasrouri Malika
11h :00 – 11h :15	For photocatalytic applications, thermally-induced evolution of biomass spherical quartz nanoparticles as Fe-doped diatomite employing in physico-chemical, thermal, and morphological measurements	Rezig Walid
11h :15 – 11h :30	Study of the transients of systems using thermal energy storage with Aspen	Abdenmour Aimne Khoudja
11h :30 – 11h :45	Simulation of the Mosque's Minaret Acting as Solar Chimney in Achieving Thermal Comfort inside the prayer space	Boulechfar Hichem
11h :45 – 12h :00	Détermination du régime de combustion sans flamme d'un mélange de diméthyléther (DME) et de gaz de synthèse	Guebli Ridha
12h :00 – 12h :15	Sensitivity Study of Environmental Factors Affecting a Greenhouse Microclimate Model	Bezari Salah
12h :15 – 12h :30	Performance Improvement of Lead-Free Halide Perovskites Solar	Belferdi Souad

	Cells using Scaps 1D Simulation	
12h :30 – 12h :45	Regime classification of ammonia/hydrogen combustion in adiabatic Well Stirred Reactor (WSR).	Addour khalissa
12h :45 – 13h :00	Etude Expérimentale du Stockage de l'Eau Chaude par Chaleur Latente d'un Matériaux à Changement de Phase.	Boumrar Iddir

## Cérémonie de Clôture Remise des attestations de participation

13h :00 – 14h :00

Salle des soutenances de la Faculté  
des Sciences de la Matière

## Déjeuner

14h :00 – 15h :00

Salle de la bibliothèque de la  
Faculté des Sciences de la Matière.

