

# The 5<sup>th</sup> International conference on Advanced Materials for Photonics, Sensing and Energy Applications (AMPSECA' 2023)

25-26 May, 2023, Marrakech, Morocco

A Conference on Advanced Materials, Emerging and Transferring New Technologies

Organized by:



Hassan First University of Settat



Moroccan Society of Advanced Materials Physics and their Applications (SMPM2A)

## Partnerships



## Conference Program

May 25, 2023			
08 :00 – 09 :00	<b>Registration</b>		
09 :00 – 09 :30	<b>Opening Ceremony</b>		
09 : 30 – 10 :00	<b>Plenary 1: Prof. Jean Michel Nunzi</b> Queen's University, Canada		
10 :00 – 10 :30	<b>Plenary 2: Prof. Lada Puntus</b> Kotel'nikov Institute of Radioengineering & Electronics, Russia		
10 :30 -11 :00	<b>Coffee break</b>		
11 : 00 – 11 :20	<b>Keynote 1 Prof. Hamid Oughaddou</b> ISMO-CNRS, Université de Paris-Sud. Université de Cergy- Pontoise, France	<b>Keynote 2: Dr. Samir Rachidi</b> Acting General Manager of IRESEN - Research Institute for Solar Energy and New Energies	<b>Keynote 3: Prof. Karol Strzałkowski</b> Nicolaus Copernicus University, Torun, Poland
11 : 25 – 11 :40	<b>Benali Hajar</b> A comprehensive simulation study of MASnI3 based solar cells for high performance <i>Hassan II University of Casablanca</i>	<b>Arbaoui Nora</b> Heating performance of a solar system to overcome temperature drops during the winter period <i>Mohammed V University of Rabat</i>	<b>Sebbahi Seddiq</b> Latest advances, current trends, and future perspectives on green hydrogen production via Proton Exchange Membrane Electrolysis Technology <i>Chouaib Doukkali University of El Jadida</i>
11 : 40- 11 : 55	<b>Guesmi Ibtissam</b> Elastic Properties computation of titanium disulfide TiS2 material at High Pressure, Using Pseudo-Potentials Technique <i>Mohammed 1st University Of Oujda</i>	<b>Assal Aicha</b> A new sustainable bioadsorbent for the depollution of toxicity load in wastewater: towards a safe operation of the El Jadida wastewater treatment plant <i>Chouaib Doukkali University of El Jadida</i>	<b>Jottrand Samuel</b> Hydrogen pipeline model for compression station pre-design <i>Université libre de Bruxelles, Aero- Thermo-Mechanics ( Belgium)</i>

11 :55 – 12 :10	<p><b>Ait Lahcen Jaouad</b> Nanoparticles effect on the desalination phenomenon using Langevin dynamic model <i>Hassan II University of Casablanca</i></p>	<p><b>Belghazdis Mohammed</b> Thermal insulation revolution in buildings between past and present: A comprehensive review <i>Moulay Ismail University of Meknes</i></p>	<p><b>Najim Abdessamad</b> The role of iodine substitution on the electronic and optical properties of CsPbBr<sub>3</sub>-xI<sub>x</sub> perovskite: A density functional theory analysis <i>Hassan II University of Casablanca</i></p>
12 :10 – 12 :25	<p><b>Derraz Meryiem</b> Design and simulation of piezoelectric Bio-composite materials for energy harvesting applications using finite element analysis <i>Chouaib Doukkali University of El Jadida</i></p>	<p><b>Abali Abdelaziz</b> Effect of annealing temperature on the different properties of the next generation <i>Cadi Ayyad University of Marrakech</i></p>	<p><b>Fairouz Moussetad</b> Structure-Based Virtual Screening of moroccan phytochemicals for Identification of New Dipeptidyl Peptidase IV Inhibitors <i>Hassan II University of Casablanca</i></p>
12 :25 -12 : 40	<p><b>Dnaya Fatima Ezzahra</b> Solid State Spectroscopy Fundamental Functions in a Nutshell <i>Abdelmalek Essaadi University of Tetouan</i></p>	<p><b>Touili Salma</b> Exploring the Potential of Lead Free BaTi<sub>0.89</sub>Sn<sub>0.11</sub>O<sub>3</sub> Ceramic Synthesized by Coprecipitation Method for Energy Storage and Electrocaloric Applications <i>IMED-Lab, Cadi Ayyad University of Marrakesh</i></p>	<p><b>Maryam HARBAG</b> Mechanical and Thermal Behavior of Compressed Earth Bricks Reinforced with Olive Waste <i>Mohammed VI Polytechnic University of Benguerir</i></p>
12 :30 – 14 :00	<b>Lunch</b>		
14 :00 – 14 :30	<b>Plenary 3: Prof. Abdelkader Kara</b> University of Central Florida, USA		
14 :30 – 14 :50	<p><b>Keynote 4: Prof. Mouhaydine Tlemçani</b> University of Evora, Portugal</p>	<p><b>Keynote 5: Prof. El-Kebir Hlil</b> University of Grenoble, France</p>	<p><b>Keynote 6 : Prof. Djouadi Abdou</b> Nantes University, France</p>

14 :50 – 15 :05	<p><b>El Khalfaouy Mohammed</b> Experimental study of the properties of Ghassoul/ natural fibers-based hybrids <i>Moulay Ismail University of Meknes</i></p>	<p><b>Ahliouati Mohamed</b> Thermal analysis of the effect of weather conditions on photovoltaic module performance <i>Chouaib Doukkali University of El Jadida</i></p>	<p><b>El Hmamsy Youssef</b> Non-linear approaches for the design of a passive hybrid circuit for energy harvesting from piezoelectric and pyroelectric materials <i>Chouaib Doukkali University of El Jadida</i></p>
15 :05 – 15 :20	<p><b>Khawla ROUIS</b> EDGE green building certification for a production unit for hypodermic syringes with needle, Morocco <i>Mohammed VI Polytechnic University of Benguerir</i></p>	<p><b>Aissi Tarik</b> Experimental investigation to discuss the influence of dust on the efficiency of different PV panels <i>Chouaib Doukkali University of El Jadida</i></p>	<p><b>Elachhab Anass</b> A Machine Learning and Deep Learning Approach with Data Augmentation for Accurate Battery State of Charge Estimation <i>Chouaib Doukkali University of El Jadida</i></p>
15 :20 – 15 :35	<p><b>Farhan Jaouad</b> The effect of Gd substitution on structural properties of the tetragonal tungsten bronze ferroelectric <math>Ba_2(1-x)Na(1+x)Gd_xNb_5O_{15}</math> <i>Hassan II University of Casablanca</i></p>	<p><b>Amlal Wadi</b> Comparative study of theoretical and empirical models of nanofluids: investigation of convective flow inside a square cavity <i>Sultan Moulay Slimane University of Beni Mellal</i></p>	<p><b>Tamin Abdelilah</b> Removal of hydrogen sulfide (H<sub>2</sub>S) from gaseous streams at low temperature <i>Chouaib Doukkali University of El Jadida</i></p>
15 :35 – 15 :50	<p><b>Tanasehte Mohammed</b> Cluster fibers distribution in failure process of composite materials <i>Hassan II University of Casablanca</i></p>	<p><b>Asdiou Nouhaila</b> Study of the adsorption of olive mill wastewater (OMW) on a natural adsorbent: Case of sawdust <i>Chouaib Doukkali University of El Jadida</i></p>	<p><b>Alaa ELOUAZANI DAHAK</b> Morocco's Transition Towards a Low-Carbon Future: Evaluating Energy Efficiency Buildings for a Green Economy <i>Mohammed VI Polytechnic University of Benguerir</i></p>
15 :50 – 16 :30	<p><b>Coffee break session (Poster I)</b></p>		

16 :30 – 16 :45	<p><b>Jabrane Meysoun</b> Investigating the influence of Transition Metal Surfaces on the electronic properties of Iron-Phthalocyanine molecule: A Density Functional Theory Study <i>Hassan II University of Casablanca</i></p>	<p><b>Askouri Reda</b> A comparative study between theoretical and simulation models to calculate specific energy consumption in the reverse osmosis process <i>Hassan II University of Casablanca</i></p>	<p><b>Ezaier Yassine</b> Improvement of techniques for identifying fouling of membranes used in water desalination and wastewater treatment <i>Hassan II University of Casablanca</i></p>
16 :45 – 17 :00	<p><b>Amiri Lahoucine</b> Effect of doping on structural, optical, and thermoelectric properties of cobalt-doped copper sulfide thin films <i>Cadi Ayyad University of Marrakech</i></p>	<p><b>Oukacha Kawtar</b> Synthesis, characterization of Cobalt-doped zinc oxide (ZnO) nanoparticles without annealing and ripening treatment for photocatalytic application <i>Mohammed V University of Rabat</i></p>	<p><b>Fakir Kossai</b> Scientific approach to construct a numerical dataset in order to modelize a thermal power plant <i>Chouaib Doukkali University of El Jadida</i></p>
17 :00 – 17 :15	<p><b>Hassine Sanae</b> Electronic and optical properties of bulk Zn<sub>2</sub>VN<sub>3</sub> ternary nitride : First-principles investigation <i>Cadi Ayyad University of Marrakech</i></p>	<p><b>Boujlili Khaoula</b> Parameter Identification of a Lithium-ion Battery Model using PSO algorithm <i>Chouaib Doukkali University of El Jadida</i></p>	<p><b>Hasnaoui Abdellatif</b> Evaluating the potential of planar h-BSb monolayer as anode materials for sodium-ion batteries from first principles methods <i>Sultane Moulay Slimane University of Beni Mellal</i></p>
17 :15 – 17 :30	<p><b>Noureddine Benrass</b> Quantifying entanglement in an optomechanical system <i>Ibn Zohr University of Agadir</i></p>	<p><b>Ben Brahim Naima</b> Thermomechanical characterization of a new material based on plaster and organic fiber <i>Mohammed V University of Rabat</i></p>	<p><b>Loubna LAGHROUCH</b> Charting a Path to Sustainability: Study of the LEED certification for a university building project <i>Mohammed VI Polytechnic University of Benguerir</i></p>

17 :30 – 17 :45	<p style="text-align: center;"><b>Salym Imad</b> New Aurivillius-Type Structural Materials for Energy Storage <i>Cadi Ayyad University of Marrakech</i></p>	<p style="text-align: center;"><b>Chataoui Hassan</b> New Honeycomb Structures of Phosphorene: A structural and energetic analysis <i>Sultan Moulay Slimane University of Beni Mellal</i></p>	<p style="text-align: center;">Bousseta Mohammed Structural and optical properties of Kesterite (CZTS) multilayer thin films obtained by RF sputtering <i>Cadi Ayyad University of Marrakech</i></p>
17 :45 – 18 :00	<p style="text-align: center;"><b>Zahid Marwa</b> Improved dielectric properties and energy storage density of PVDF-HFT nanocomposites by surface-modified BaTi<sub>0.89</sub>Sn<sub>0.11</sub>O<sub>3</sub>/polydopamine nanoparticles <i>Cadi Ayyad University of Marrakech</i></p>	<p style="text-align: center;"><b>Abderrazak Toulil</b> Nanoparticle size effect on thermal conductivity of Cu-water nanofluid using molecular dynamics simulations <i>Sultan Moulay Slimane University of Beni Mellal</i></p>	<p style="text-align: center;"><b>Jamaa Abdelkbir</b> Analyse, design and Comparison of Perturb &amp; Observe, Incremental conductance, and Fuzzy Logic Controller in Maximum Power Point Tracking System for PV System by Using MATLAB/Simulink <i>Hassan II University of Casablanca</i></p>
18 :00 – 18 :15	<p style="text-align: center;"><b>El-Jallal Said</b> Backbone with holes and pillars for light trapping inside a thin layer <i>Cadi Ayyad University of Marrakech</i></p>	<p style="text-align: center;"><b>Hidki Rachid</b> Numerical Analysis of Mixed Convection in a Ventilated Horizontal Channel Containing Heat-Generating Blocks <i>Cadi Ayyad University of Marrakech</i></p>	<p style="text-align: center;"><b>Elouali Samia</b> Complexation of mercury by chitosans extracted from scorpion species "Buthus Atlantis" <i>Cadi Ayyad University of Marrakech</i></p>
18 :15 – 18 :30	<p style="text-align: center;"><b>Abdelghani Souani</b> Formulation and characterization of a local bio-geo-based composite for the manufacture of rammed earth <i>Mohammed VI Polytechnic University of Benguerir</i></p>	<p style="text-align: center;"><b>Zhang Jia-Wei</b> A Passive Optical Sensor with Wide Measurement Range for the Electromagnetic Monitoring <i>School of Electrical Engineering, Xi'an University of Technology (China)</i></p>	<p style="text-align: center;"><b>Yamna Soussi</b> Multi-objective optimization of daylight performance and energy saving in a modular building with light-shelf and light control <i>Mohammed VI Polytechnic University of Benguerir</i></p>
18 :30 – 19 :15	<b>Poster Session II</b>		

May 26 , 2023			
08 :30 – 09 :00	<b>Plenary 4: Prof. Abdelhamid Errachid</b> Institute of Analytical Sciences, Claude Bernard Lyon, France		
09 : 00 – 09 :30	<b>Plenary 5: Prof. Tewfik Soulimane</b> Bernal Institute, University of limerick, Ireland		
09 :30 – 09 :50	<b>Keynote 7: Pr. Jacek Zakrzewski</b> Nicolaus Copernicus University, Torun, Poland	<b>Keynote 8: Prof. Jacques Jay</b> INSA Lyon, France	<b>Keynote 9: Prof. Przemyslaw Płócnick</b> Nicolaus Copernicus University, Torun, Poland
9 :50 – 10 :30	Coffee break (session Poster III)		
10 :30 – 10 :45	<b>Nouri Youssef</b> Development of experimental and theoretical characteristics of sprayed SnS thin films <i>Hassan II University of Casablanca</i>	<b>Jamal Elmansour</b> Effect of erosion rate due to Seawater on Francis turbine efficiency <i>Chouaib Doukkali University of El Jadida</i>	<b>Aylaj Mina</b> Use of sugarcane bagasse and immature horse manure for municipal solid waste composting and humic acid extraction <i>Chouaib Doukkali University of El Jadida</i>
10 : 45 – 11 :00	<b>Drissi Safia</b> Effect of annealing on structural, morphological, electrical and optical properties of CFCTS thin films <i>Cadi Ayyad University of Marrakech</i>	<b>Louazani Mohamed</b> Output Voltage Forecasting Approach of Lithium-Ion Batteries in Electric Vehicles <i>Chouaib Doukkali University of El Jadida</i>	<b>Bensemali Hafssa</b> Impact of recent developments on the salubrity of the oualidia-sidi moussa lagoon complex: geochemical approach <i>Chouaib Doukkali University of El Jadida</i>
11 :00 – 11 :15	<b>Abouais Ali</b> Thermal characterizations of Zn <sub>1-x</sub> MnxSe mixed crystals grown by vertical Bridgman method <i>Chouaib Doukkali University of El Jadida</i>	<b>Marouane Aannir</b> Optimization of Spent Electric Scooter Lithium-Ion Battery Leaching through Phosphoric Acid and Doelhart Model Experimental Design <i>Cadi Ayyad University of Marrakech</i>	<b>Baraket Abdoullatif</b> Electrochemical Immunosensor for NT-proBNP Detection in Human Saliva: Heart Failure Biomedical Application <i>Institut de Sciences Analytiques (ISA), Université de Lyon (France)</i>

11 :15 – 11 :30	<p><b>Ait Hamdan Youssef</b>  Physicochemical and Biological Investigation of Chitin and Chitosan from Scorpion (Androctonus mauritanicus)  <i>Cadi Ayyad University of Marrakech</i></p>	<p><b>Mesbahi Oumaima</b>  Parameters Extraction of Single and Double Diodes Photovoltaic Models using A Novel Cost Function  <i>University of Evora, Department of Mechatronics, Evora (Portugal)</i></p>	<p><b>Rami Mouhssine</b>  Impact of the zero-export energy on the economic side of ONgrid residential PV plant. Case study of Morocco  <i>Chouaib Doukkali University of El Jadida</i></p>
11 :30 – 11 :45	<p><b>Ait Ichou Mohamed</b>  Study of the deposition of TiNi thin films on Ni(001) substrate using molecular dynamics simulation  <i>Hassan First University of Settat</i></p>	<p><b>Adeli Khaoula</b>  A Theoretical Investigation of Energy Recuperation from Exothermic Reactions in Chemical Ammonia Processes  <i>Hassan II University of Casablanca</i></p>	<p><b>Said Elmassi</b>  Cobalt-Doped NiO Thin Films as p-type Transparent Conducting Oxide with Enhanced properties prepared by Reactive Radio Frequency Sputtering  <i>Cadi Ayyad University of Marrakech</i></p>
11 :45 – 12 :00	<p><b>Zibar Wafaa</b>  Improving the Electrical Properties and Durability of GaAs Metal-Oxide-Semiconductor Capacitors by Passivation using LF-PECVD and HF-PECVD Methods  <i>Hassan II University of Casablanca</i></p>	<p><b>Moushi Salma</b>  Modeling of the pressure drop effect using membrane distillation in the desalination process  <i>Hassan II University of Casablanca</i></p>	<p><b>Wiame Maslak</b>  Energy Optimization in Healthcare Facilities: Balancing Air Quality and Thermal Comfort in Hospital Settings  <i>Mohammed VI Polytechnique University of Benguerir</i></p>
12 :00 – 12 :15	<p><b>Elghanaoui Souad</b>  Three-dimensional finite element modeling of the human ear from CT imaging  <i>Chouaib Doukkali University of El Jadida</i></p>	<p><b>Younis Abubaker</b>  Modeling and Validation of the Thermal Effect of Dust Soiling on a Solar Cell  <i>Transilvania University of Brasov (Romania)</i></p>	<p><b>Tair Melaid</b>  Physical hydrogen storage properties of Mg-based hydrides perovskite through first principles calculations  <i>Hassan II University of Casablanca</i></p>



12 :15 – 12 :30	<p><b>Lamiae Bourassi</b> A molecular dynamics (MD) simulation of the solubility behaviours of cellulose in aqueous cuprammonium hydroxide solution <i>Mohamed First University of Oujda</i></p>	<p><b>Tchakounté Hyacinthe</b> Design and Realization of a Solar Dryer Based on Local Materials for Cocoa Beans Drying PKFokam <i>Institute of Excellence (Cameroon)</i></p>	<p><b>S. ED-DALI</b> Improving Indoor Environmental Quality and Energy Efficiency through LEED O+M Certification: A Case Study of AL AKHAWAYN University Library in Morocco <i>Mohammed VI Polytechnique University of Benguerir</i></p>
12 :30 – 14 :30	<b>Lunch</b>		
14 :30 – 15 :00	<p><b>Plenary 6: Prof. Paras N. Prasad</b> Institute for Lasers, Photonics and Biophotonics, University at Buffalo (USA)</p>		
15 :00 – 15 :30	<p><b>Plenary 7: Prof. Anna Zawadzaka</b> Nicolaus Copernicus University, Torun, Poland</p>		
15 :30 – 15 :45	<p><b>Zaim Salma</b> Evaluation of the particulate matter concentration variability related to meteorological factors in Rabat city <i>Mohammed V University of Rabat</i></p>	<p><b>Yassine El Kiri</b> Predicting the failure of plain dent pipeline subjected to cyclic loads using an artificial neural network <i>Hassan II University of Casablanca</i></p>	<p><b>K. EL HADRI</b> Summer comfort and passive cooling techniques by natural ventilation: Case study of UM6P classrooms <i>Mohammed VI Polytechnique University of Benguerir</i></p>
15 :45 - 16 :00	<p><b>Hilmi Dalal</b> Complex conductivity as tool to investigate the electrical behavior between graphene oxide and reduced grapheme <i>Chouaib Doukkali University of El Jadida</i></p>	<p><b>El Mouncharih Abdelkarim</b> One-dimensional photonic crystal-based biosensor for the detection of organic materials in wastewater <i>Cadi Ayyad University of Marrakech</i></p>	<p><b>El Kassaoui Majid</b> Supported Solid-state materials for Hydrogen Storage <i>Mohammed V University of Rabat</i></p>

16 :00 - 16 :15	<p><b>Es-Saddik Mohammed</b> Sintering effect on the microstructural, and mechanical properties of natural hydroxyapatite derived from animal bone wastes <i>Abdelmalek Essaadi University of Tetouan</i></p>	<p><b>Zerouga Hakima</b> Properties of ZnO with DFT and Characterization of Cu-doped ZnO thin film assimilated by Sputtering and Sol-gel <i>Mohammed V University of Rabat</i></p>	<p><b>Jaoide Essaid</b> Design and loss assessment of the qZSI inverter used for PV power systems <i>Hassan First University of Settat</i></p>
16 :15 – 16 :30	<p><b>Boubakri Asma</b> Influence of TEA chelating agent on structural, morphological, compositional and optical properties of electrodeposited SnS <i>Cadi Ayad university of Marrakech</i></p>	<p><b>Khalil El Meniari</b> Hardware Implementation of Particle Swarm Optimization Algorithm on FPGA Cyclone V <i>Hassan II University of Casablanca</i></p>	<p><b>Khouili Oussama</b> Predicting of Solar Radiation Through Machine Learning and Deep Learning <i>Chouaib Doukkali University of El Jadida</i></p>
16 :30 – 17 :00	<b>Coffee break</b>		
17 :00 – 17 :15	<p><b>Elorch Mohamed</b> Magnetic field and inclination effects on entropy generation in a square cavity filled with Cu-H<sub>2</sub>O based nanofluid <i>Sultan Moulay Slimane University of Beni Mellal</i></p>	<p><b>Khaled Mnaouer</b> A new prototype of carbon dioxide molecule cracking <i>Chouaib Doukkali University of El Jadida</i></p>	<p><b>Harchaoui Mohamed</b> Investigation of Phase Change Material Integration on Buildings: Numerical Study in Semi-Arid Climate of Khouribga <i>Sultan Moulay Slimane University of Beni Mellal</i></p>
17 :15 – 17 :30	<p><b>Choubi Manal</b> Thermodynamic properties and magnetocaloric effect of mixed spins (3/2, 1) square lattice <i>Hassan II University of Casablanca,</i></p>	<p><b>Mansouri Zouhir</b> Chemical functionalization and stability of two-dimensional layered black phosphorus with impurities: Insights from DFT and AIMD <i>Mohammed V University of Rabat</i></p>	<p><b>El-Gheryby Youssef</b> Electrodeposition and characterization of CuO thin films <i>Moulay Ismail University of Meknes</i></p>
17 :30 – 17 :45	<p><b>Assila Abdelmajid</b> Recent progress on the development of lithium borohydride LiBH<sub>4</sub> for hydrogen storage under uni/bi/triaxial strain: A DFT <i>Chouaib Doukkali University of El Jadida</i></p>	<p><b>Wissal HERRA</b> Energy performance assessment of Double window system integrated to cavity wall and their effects on the indoor thermal</p>	<p><b>Driouch Imane</b> Molybdenum doping effect in structural properties of SnO<sub>2</sub> for anode material <i>National Center for Energy, Sciences and Nuclear Techniques -CNESTEN- Rabat</i></p>

		comfort for a residential building in mountainous cold climate <i>Mohammed VI Polytechnic University of Benguerir</i>	
17 :45 – 18 :00	<b>El Fallak Nouhayla</b> Electronic, optical, elastic properties and atomic population of zinc peroxide: First-principles calculations <i>Chouaib Doukkali University of El Jadida</i>	<b>Zhang Jia-Wei</b> A Passive Optical Sensor with Wide Measurement Range for the Electromagnetic Monitoring <i>School of Electrical Engineering, Xi'an University of Technology (China)</i>	<b>El Boughdadi Mohamed</b> Optimization of new inorganic BaZrSe3 based perovskite solar cell by numerical simulation using SCAPS-1D. <i>Chouaib Doukkali University of El Jadida</i>
18 :00 – 18 :15	<b>Cherrad Hajar</b> Strain and stress effect on the gap of sprayed deposited Zn:Nd thin films <i>Ibn Tofail University of Kenitra</i>	<b>El Ouedghiri-Idrissi Ismail</b> Investigations of photophysical properties of organic material Diphenyl Quinoxaline <i>Hassan II University of Casablanca</i>	<b>Lakouader Afaak</b> Energy storage properties of lead-free ferroelectric Ba0.85Ca0.15Ti0.9Zr0.1O3 thin film heterostructure <i>Cadi Ayyad University of Marrakech</i>
18 :15 – 19 :00	<b>Poster Session IV</b>		
19 :00 – 20 :00	<b>Closing Ceremony</b>		

<b>Poster Session I</b>		
<b>Code</b>	<b>AUTHOR</b>	<b>TITLE</b>
P1	Aba Mohamed	A review of soil heavy metals pollution from mines in Morocco: implication for human health
P2	Omar Farkad	Effects of Sr-intercalated on transports properties of AB-stacked bilayer graphene.
P3	Abdelfettah Lahbib	Monte Carlo study of phase diagrams, magnetic characteristics and compensation behavior of a mixed spin (3/2, 1/2) ferrimagnetic system for a cubic nanowire lattice
P4	Abdellah Laqhaili	Essential oil of the plant Thymus as ecological inhibitor corrosion for mild steel in HCl solution
P5	Abdellatif Aarfane	Experimental and molecular dynamics study of reactive red 141 and methylene blue adsorption by Cuttlebone in the aqueous solution

P6	Chellakhi Abdelkhalek	An Improved Variable Step Size MPPT Based-Current Perturbation P&O Algorithm for PV System Uses
P7	Abidi Brahim	Use of different alcoholic extracts of TALF to inhibit corrosion of C38 steel in 1M HCl medium.
P8	Abkhair Abdellatif	Marine renewable energy wave energy converter
P9	Abouais Ali	Effect of lattice disorder on the thermal conductivity of ZnMgS
P10	Abouricha Noureddine	Lattice Boltzmann modeling of heat transfer in a Local Heated by Floor with Sinusoidal Heating
P11	Mossaddek Meriem	Enhanced State of Charge Estimation of Lithium-Ion Batteries Using Extended Kalman Filter Algorithm for Electric Vehicle Applications
P12	Adiba Elbouzekri El Idrissi	Environmental sustainability of dynamic location of modular mobile facilities in a hyperconnected production network
P13	Ahmed Md Tofael	A Parametric Study and Efficiency Analysis Hybrid PVT System
P14	Ahsen Chaimae	A thermal energy waste recovery methodologies and applications: case of tertiary buildings
P15	Ajabli Houda	Thermal Evaluation of New Insulation Materials for Building Envelope Based on Vegetal Wastes
P16	Akroud Touria	A comparative study of local quantum Fisher information and quantum entanglement in transverse field XY model
P17	Alla Fadwa	Study of thermo-physical properties and cycling stability of D-Mannitol and D-sorbitol as PCMs
P18	Benaomar Khaoula	Energy efficient building design for climate change mitigation: A case study of Morocco
P19	Ammari Mustapha	Effect of cadmium sources on the structural, morphological, and optical properties of CdS films for solar cells by chemical bath deposition (CBD)
P20	Anoua Rania	Experimental and computational analysis by DFT of the natural dye extracted from Red Algae for solar cells realisation
P21	Anoua Rania	Physical properties of the natural dye extracted from Red Algae for solar cells application
P22	Arba Youssef	Effects of Molar Concentration on Structural and Optical Properties of Co <sub>3</sub> O <sub>4</sub> Thin Films
P23	Badii Soufiane	Real-Time Hardware-in-the-Loop Simulation for Dual Active Bridge Converter using dSPACE and PLECS RT Box
P24	Baiboud Mohamed	First-principles study of structural, electronic and magnetic properties in vanadium doped CdTe diluted magnetic semiconductors
P25	Bakassi Imane	Effect of shell size and composition on optical properties of core/shell type-II quantum dot for photovoltaic application
P26	Souad Ait Saghir	Exploring Dielectric Properties of SnTiO <sub>3</sub> : A First-Principles investigation based on modern theory of polarization
P27	Belghiti Hamid	Performance improvement of photovoltaic system using a new advanced adaptive PID controller with MPPT algorithm
P28	Ben Bouchaib Najwa	Convective Heat Transfer Coefficient Measurement In Modern Moroccan Buildings

P29	Benaissa Nouhaila	Experimental and numerical simulation studies of CuO thin films performance based solar cells
P30	Bendany Mohamed	Development of a new polymer/carbon electrochemical sensor on a glassy carbon electrode for the detection of tetracycline
P31	Bghour Mustapha	Density functional theory calculations of the band structure, halfmetallicity and Curie temperature of rutile-GeO <sub>2</sub> doped and co-doped with Co, Fe transition metals
P32	Bortali Meryem	Modeling and optimization of harbor dredged sediment for valorization in civil engineering
P33	Bouabdalli El Mahdi	Study of the effect of erbium on the structural, physical, thermal, and optical properties of erbium-doped silicophosphate glasses for application in photonics and solar cells
P34	Bouchra Belahrach	MXenes composites in water purification and environmental remediation
P35	Bouhouche Ichraq	From Waste to Resource: Utilizing Green Tea Waste for Sustainable Development for various sectors
P36	Boujlili Khaoula	Comparative Research on RC Equivalent Circuit Models Performance for Li-Ion Batteries
P37	Boukhlifi Adil	Impedance Study of the PU-PZT Composite Materials
P38	Boumhamdi Mohammed	Photothermal Piezoelectric Methods in the Investigations of Thermal and Optical Parameters of Cd(1-x)Be(x)Te
P39	Bounjoum Youssef	Experimental study of concrete beams reinforced with a natural fibers composite
P40	Bousdra Hamza	Effect of the spontaneous and piezoelectric polarization on the performance of InGaN/GaN multiple quantum well solar cells
P41	Hind Chakir	Schottky barrier height at Au-n-GaAs contacts
P42	Bouzaid Sohaib	Review of battery equalization techniques
P43	Chajri Fatima Zahra	Synthesis of Nanostructured Calcium Vanadate/Apatite Phosphates for Evaluation of Vanadate and Phosphorus wastes
P44	Chakiri Siham	Multi-loop control of a single-stage photovoltaic system connected to the single-phase grid using a Multi-level NPC inverter
P45	Charqui Zouhair	Development of Multicellular Flows by Natural Convection in a Tall, Partitioned Cavity Confining Air and Water
P46	Cherkaoui Jaouad Nada	Enhancing Piezoelectric Performance for Vibration Control and Energy Harvesting
P47	Chellakhi Abdelkhalek	An Amended Indirect Adjustable Step Size MPPT InC Control Strategy Using PID Controller for PV System Applications
P48	Hicham MASTOURI	Efficient Home Energy Management: An Automated Solution for Comfort and Sustainability
P49	Chtaibi Khalid	MRT-LBM Analysis of Magnetic Fields Effects on Natural Convection in a Rhombus-shaped Cavity Containing a Heating Cylindrical Body and Filled with a non-Newtonian Fluids
P50	Doubi Youssef	Synthesis of SnO <sub>2</sub> rutile by Chemical spray pyrolysis in order to improve the performance of gas sensor

Poster Session II		
Code	AUTHOR	TITLE
P1	Dounia Elmesouli	Non-linear control of a power structure for the supply of electric vehicles
P2	Eddakoun Abdelhaq	Modelling and simulation approach of collective motion with elastic interactions
P3	El Aallaoui Najla	Photophysical Properties of Hole Transporting Material based Carbazole core for perovskite solar cells
P4	El Amrani El Hassani Iliass	Perovskite-type Ni-doped BaSnO <sub>3</sub> prepared by coprecipitation and characterization for solar DSS cells
P5	Najih Ikrane	Elaboration and Characterisation of a Biodegradable 3D Printed Ferroelectret as a Mechanical Sensor
P6	El Bachlaoui Ayoub	Straw as a biosource material for use in building insulation walls
P7	El Faroudi Loubna	Enhanced Photocatalytic Activity of Zinc Oxide-Reduced Graphene Oxide (ZnO-rGO) Nanocomposites for Environmental Remediation
P8	El Habib Abdellatif	Synthesis and characterization of Gd doped CeO <sub>2</sub> thin films for optically passive counter electrodes in electrochromic device
P9	El Haloui E.	Etude des propriétés de NaFePO <sub>4</sub> -type olivine comme matériaux de stockage d'énergie dans les batteries au Sodium-ion par la méthode ab-initio
P10	El Hamzaoui Fatima-Zahra	Modelling and simulation of solar photovoltaic module using Matlab / Simulink
P11	El Hana Ahmed	Numerical modelling of the thermophysical properties of nanofluids flowing in a porous medium
P12	El Joumri Loubna	Olive mill wastes management
P13	El Kake Abdelhadi	Lithium-ion battery modeling in Simscape/matlab and state of charge estimation using Kalman filtering
P14	El Massi Said	Effect of Oxygen percentage on structural, optical and electrical properties of sputtered Nickel oxide thin films
P15	El Mouden Mahmoud	Numerical investigation of nanofluids application in hybrid photovoltaic/thermal cooling system
P16	N. Ben Bouchaib	Convective heat transfer coefficient measurement in modern Moroccan buildings
P17	El Rharib Abdelkhalek	Investigation of Rb <sub>2</sub> SnBr <sub>4</sub> I <sub>2</sub> and Cs <sub>2</sub> SnBr <sub>3</sub> I <sub>3</sub> based double perovskites solar cells
P18	El Aïrch Mohamed	Magnetic field and inclination effects on entropy generation in a square cavity filled with Cu-H <sub>2</sub> O based nanofluid
P19	Elachhab Anass	Improved State of Charge Estimation for Li-Ion Batteries Based on Neural Networks Considering Temperature Variations
P20	Elamraoui Sabah	Removal of organic load from Olive mill wastewater by adsorption
P21	Elbouzekri El Idrissi Adiba	Environmental sustainability of dynamic location of modular mobile facilities in a hyperconnected production network
P22	El-Gheryby Youssef	Electrodeposition and characterization of CuO thin films

P23	Elhafidi Elmokhtar	Electrical conductivity analysis for assessing pool water disinfection
P24	Elhattab Kamal	Development of an intelligent agriculture system for large agricultural fields using low energy and based on the Internet of Things
P25	El-Jallal Said	Backbone with holes and pillars for light trapping inside a thin layer
P26	Eljouad Mohamed	First investigation of the effect of strontium oxide on the structure of phosphate glasses using molecular dynamics simulations
P27	Elmelouky Abderrahmane	Monitoring of the water magnetization mechanism by spectroscopy impedance and dielectric
P28	Elmountassir Abdelhamid	Construction using local biosourced materials: Alternative for better energy efficiency and a tool for sustainable development, case of Morocco
P29	Elouakassi Noumane	Thin films based nanocomposites for photovoltaics: synthesis and optical properties
P30	El-Yahyaoui Asmae	PhD
P31	Emouaddine Manal	Modeling of an erbium-doped fiber amplifier
P32	Ennasraoui Brahim	Highly efficient Sun-light-active CN/ BiC/SW nanocomposites for photocatalytic degradations of dyes
P33	Erradi Amine	Study of the solidification process of the electrolyte of a damaged supercapacitor to identify the mechanism behind the aging process
P34	Bouabdalli El Mahdi	Investigation of the effect of heat-treated on the structural, thermal and magnetic properties of europium containing in a strontium phosphate glasses for solar cell photovoltaic applications
P35	Es-Saidi Ikrame	A review of the use of functionalized hydroxyapatite materials for heavy metal remediation in the aquatic environment
P36	Es-Saidi Ikrame	Ionic conductivity of the heat-treated Moroccan natural phosphate and its (Na, Li)-modified materials
P37	Faraji Mustapha	Forced convection analysis within a channel heated by protruding heat source: Lattice Boltzmann Method
P38	Fatihi Dounia	Simulating CIGS-based Solar Cells for Enhanced Performance
P39	Fouad Belhora	Characterization and Dielectric Analysis of Lead Magnesium Niobate-Lead Titanate (1-x)PMN-xPT Ceramics at the Morphotropic Phase Boundary
P40	Fouad Belhora	Harvesting energy of vibrational using piezoelectric material PZT / Cu
P41	Foulah Houda	Comparison Between Experimental Testing And Numerical Simulation Of Polyester Matrix Composites Reinforced With Silica Glass Fibers
P42	Gadda Nouhaila	Valorization of an organic waste for the treatment of liquid effluent containing methylene blue by adsorption
P43	Garmim Taoufik	Numerical study of the novel inorganic InSnCl <sub>3</sub> based perovskite solar cell using SCAPS-1D device simulation
P44	Garmim Taoufik	Theoretical analysis of new solar cell based on SnS thin films by addition of p+-CuO BSF: A numerical simulation by SCAPS-1D.

P45	Ghazi Sara	Mechanochemical synthesis of Ag <sub>2</sub> CO <sub>3</sub> -Ag <sub>2</sub> SO <sub>4</sub> -(a)TiO <sub>2</sub> ternary composite and its photocatalytic activity under visible light irradiation
P46	Guidara Awatef	Structural, mechanical and biological properties of Al <sub>2</sub> O <sub>3</sub> -Fap composites as a promising material for bone implants
P47	Hammi Zineb	Production of green hydrogen employing proton exchange membrane water electrolyzer : Characterization of electrolyte membrane . A critical review
P48	Hamza Mhamdi	Analytical study of quantum teleportation and entanglement of two-interacting qubit system in graphene lattices
P49	El Aouam Abir	Synthesis, Characterization, Electrochemistry, and In Situ X-ray Diffraction Investigation of LiNi <sub>x</sub> MnyCo <sub>1-x-y</sub> O <sub>2</sub> as a Positive Electrode Material for Lithium Ion Batteries
P50	Hassoune Jamila	connaissances et attitudes des agriculteurs de la ville d'Er-Rachidia en mati�re de l'utilisation des pesticides

Poster Session III		
Code	AUTHOR	TITLE
P1	Hatimi Badreddine	Pyrrhotite and kaolin-based ultrafiltration and microfiltration membrane; elaboration and application in a cascade system for dairy and textile wastewaters treatment
P2	Hinna Maha	The influence of temperature on the development of (CuO) thin films as a semiconductor material according to the spray pyrolysis method
P3	Hairch Youssef	The separation of hydrogen from carbon dioxide using polymeric membranes
P4	Jaouhari Youssef	Integration of climate risk management in industrial reception aeras: case of AA t Melloul industrial area (Morocco)
P5	Jbilou Safia	Electrical modelling for cold plasma generation
P6	Kamal Abdellatif	Scattering in Quantum Dot of Monolayer Molybdenium Disulfide
P7	Kandry Hafsa	Enhancement of Photovoltaic Panel Efficiency through Implementation using Thermoelectric Cooling System
P8	Karouiti Nadia	Integrating Solar Photovoltaic Technology for Sustainable Desalination
P9	Kawtar Bria	Ion-induced atomic excitation in V and V+O <sub>2</sub> target. Experiment and simulation study.
P10	Khaddoudi Idris	Photocatalytic Removal of Rhodamine B from Aqueous Solutions Using titania-fluorapatite composite
P11	Khalfi Hassna	Modeling and analysis of axisymmetric vibration in a piezoelectric resonator with current excitation using the Legendre polynomial method
P12	Khentaoui Oussama	Backstepping Control of Single Phase Half Bridge Shunt Active Power Filter
P13	Kouri H	Inhibition of corrosion of C38 steel in 1M H <sub>3</sub> PO <sub>4</sub> medium by an esomeprazole drug waste
P14	Laasri Said	Recent advances in ZrNi-based intermetallic hydride for solid-state hydrogen storage: Ab-initio insight



P15	Laasri Said	The Effect of ZrO <sub>2</sub> and Al <sub>2</sub> O <sub>3</sub> addition on the mechanical and physical properties of HAP
P16	Labdere Outman	Calculated properties of GdNi intermetallic compound for the nitrogen liquefaction process: Insight into Ab-initio Computations and Monte Carlo Simulation
P17	Labrag Abdelaziz	Cr-doped rutile GeO <sub>2</sub> : first principle calculations of electronic and band structure properties
P18	Lafhal Amer	Critical And Compensation Behaviors Of A Hexagonal Ising Nanotube With Negative Core-Shell Coupling
P19	Lahcen Nkhaili	Optical and Electrical Characteristics of CZTS Thin Films Prepared by RF-sputtering
P20	Lahkale Redouane	Investigating the proton conduction in Mg-Fe Layered Double Hydroxide using impedance spectroscopy
P21	Belkoufa Ikram	First principles study of hydrogen storage material NaBH <sub>4</sub> compound: Electronic structure and thermodynamic properties
P22	Lamhar Raowia	Évaluation de l'évolution spatio-temporelle de la mousse formée lors du traitement électrochimique d'un effluent synthétique de textile
P23	Laouid Amina	Influence of temperature on the morphological, electrical, and optical properties of ZnO-SnO <sub>2</sub> Thin Films deposited by physical vapor deposition (PVD).
P24	Laouid Amina	Characterization of the morphological, electrical, and optical properties of BaO thin Films deposited by physical vapor deposition (PVD).
P25	Librahimi Soraya	TREATMENT OF OLIVE OIL MILL WASTEWATER BY ADSORPTION VIA NATURAL ADSORBANTS
P26	Louzazni Mohamed	Assessment of a Lithium-Ion Battery Cell Using an Automotive Drive Cycle Measurements: Application of Modified Neural Network
P27	Machrouhi Khalil	LBM for Fluid Dynamics and Pollutant Transport Simulation
P28	Makir Zakaria	Materials for energy efficiency
P29	Chahid El Ghaouti	Dielectric and electric properties as a tool to investigate the Filtration of Hexavalent Chromium through an Ultra-Filtration Ceramic Membrane
P30	Marhraoui Samira	Different models of deep learning neural networks for short-term output PV power forecasting
P31	Maziane Youssef	Energy harvesting from a vehicle suspension system
P32	Md Suruj Ali	Solar PV based Smart Nanogrid Design for Promoting Entrepreneurship and Economic Growth in Underserved Areas Using AutoCAD and MATLAB Simulink
P33	Misski Bouabid	Piezoelectric materials
P34	Morchid Hajar	Efficient Home Energy Management: An Automated Solution for Comfort and Sustainability
P35	Mostafa Ellassfour	Effect of Chemical Composition on Structural and Electrical Properties of Stoichiometric-Hydroxyapatite
P36	Moujid Salma	How does the presence of a vapor barrier impact the transfer of heat and moisture through a wall ?
P37	Nefraoui Amal	Electrical and thermal study to discuss the effect of temperature difference inside the PV module and through the junction box

P38	Nasrellah Hamid	Optimization Of The Size Of Crystalline Nano-Calcite Obtained From Phosphogypsum Using The Precipitation Method
P39	Nezami Savojbolaghi Mina	The effect of temperature on perovskite solar cells
P40	Abdelhadi Belouad	Energy Levels in Molybdenum Disulfide Quantum Ring
P41	Lucrece Barbara Penpen Komgue	Finite element study of acoustic attenuation of hearing protectors in a two-dimensional axisymmetric model of the human ear
P42	Belghiti Hamid	Improved MPPT method to optimizing the performances of photovoltaic system under real climate conditions
P43	Oumoussa Hajar	Development of a new electrochemical sensor for the detection of amoxicillin
P44	Rabouli Mohamed	Environmental characterization of port dredged sediments for valorization as construction materials
P45	Rachidy Chaymaa	Numerical modelling of the effect of MAPI3 thin film on ITO/TiO <sub>2</sub> /MEH-PPV/Au solar cell.
P46	Raghib Rabab	Numerical modeling of guided waves in three-layer functionally graded cylinders: Legendre polynomial method
P47	Rashel Masud Rana	Development of IoT based Maximum Power Point Tracking with Fault Detection Technique
P48	Redouane Mghaiouini	Development and microstructural and mechanical characterization of a new construction material based on fly ash
P49	Rejdali Hajar	Molecular dynamics simulation of interactions between polymorphs ( $\hat{I}^{\pm}$ and $\hat{I}^2$ ) of polyvinylidene fluoride and solvents molecules
P50	Rhalmi Othmane	Biocomposite films based Starch / Cellulose: investigation of mechanical, dielectric and electrical properties

Poster Session IV		
Code	AUTHOR	TITLE
P1	Riad Ayoub	Investigation on the effects of varying the copper tube size to improve the electrical and thermal performance of the PV/T system
P2	Rich Mohamed	Optimisation of the insertion depth of the earplug in the ear canal of a 2D axisymmetric model of the human ear
P3	Rjafallah Abdelkader	Elaboration, characterization, modelling and application of the polyurethane/lead zirconate titanate composites for mechanical energy harvesting
P4	Rkia Zari	Synthesis of microporous and low cost zeolite X from Moroccan coal fly ash for the sorption of textile dye
P5	Saad Basma	Recent Advances in Solar Photovoltaic Power Prediction using Artificial Intelligence: A Systematic Review and Benchmarking
P6	Sabani Erroumayssae	Optimizing Rolling Bearing Maintenance: Wavelet Analysis for Early Fault Detection and Prevention
P7	Sadek Othmane	Elaboration and characterization of titanium dioxide thin film by sol-gel/spin-coating method

P8	Sadek Otmane	Photocatalytic degradation of methylene blue on multilayer TiO <sub>2</sub> coatings elaborated by the sol-gel spin coating method
P9	Sadeq Hajar	Numerical Study Of Internal Radius Effect On Mechanical Behavior Of P265gh Material
P10	Said Jihane	Overview of Powder Recycling in Metal Additive Manufacturing
P11	Said Jihane	Synthesis and Characterization of Poly(3-Hydroxybutyrate-co-3-Hydroxyvalerate)-g-Polycaprolactone for 3D Printing Applications.
P12	Said Jihane	3D-Printing Bio-based Polymer: Processes, Materiels, Applications and Challenges.
P13	Salhi Imane	Affordable measurement of heat capacity and thermal conductivity of composites
P14	Salma Kaotar Hnawi	The performance of the organometallic complexes in solar cells
P15	Takassa Rabi	Electronic and thermoelectric properties of carbon and carbon nitride nanotubes
P16	Sdira Hajar	Towards improving the physicochemical and thermal properties of ceramics materials through sintering process
P17	Siniti Mostapha	Thermodynamic study of the glass relaxation phenomena: Influence of annealing below T <sub>g</sub> on the thermal behavior and enthalpy of maltitol glass by reaction calorimetry
P18	Smairi Salma	Formation of CZTSSe thin films using sputtering technique for solar cells application
P19	Tabine Abdelhakim	Development of an error prediction model based on temperature variations for SOC estimation of batteries
P20	Tabine Abdelhakim	Exploring the performance of lithium-ion batteries via neural networks
P21	Tahiri Abdellah	The first Principal Study: Structural, elastic, mganetic, electronic, optical properties of Co <sub>2</sub> MnTi Heusler
P22	Tamin Abdelilah	Adsorption of hydrogen sulfide (H <sub>2</sub> S) from gas streams
P23	Hariti Nora	First-principles stability study of olivine NaMPO <sub>4</sub> (M: Mn, Fe, Co, Ni) and doping of NaMnPO <sub>4</sub> with Fe and Ni
P24	Taroual Khadija	Modeling and simulation of a graphene-based nanofiller
P25	Traore Lassana	Evolution of dew water, used for PV cleaning, depending on climatic parameters.
P26	Farajy Mohammed	Enhancing the Efficiency of CuBi <sub>2</sub> O <sub>4</sub> Thin Film Solar Cells via SCAPS Simulation and Impedance Spectroscopy
P27	Chakar Khadija	Synthesis of TiO <sub>2</sub> Nanofluids using water or Ethylene Glycol as base fluid
P28	Zaim Soumia	Deep analysis of the complex conductivity to investigate the complexation process between Gum Arabic and Chitosan.
P29	Zaini Mohammed	The effects of post curing process on tensile property of basalt-jute-glass-carbon fiber reinforced polymers. numerical study.
P30	El Ghyati Nabil	Simulation of CIGS thin film solar cell for high efficiency performance using SCAPS and Impedance spectroscopy

P31	Zga Oumaima	Geothermal potentials of improving energy efficiency in buildings in semi-arid climate: the pebbles bed thermal storage
P32	Zhang Bin	Micro-displacement Energy Harvester Based on Piezoelectric and Electromagnetic Hybrid Mechanisms
P33	Ziti Ahmed	Advancement of Cu <sub>2</sub> MgSnS <sub>4</sub> absorbers materials deposited by dip-coating route
P34	Zmirli Zakia	Less energy and aluminum electrode consumption for fluoride removal using electrocoagulation process
P35	Abdellah Laqhaili	Essential oil of the plant Thymus as ecological inhibitor corrosion for mild steel in HCl solution
P36	Zouhair EL Jouad	Numerical analysis and optimization of Organic Photovoltaic Cells using SCAPS-1D
P37	Abdelmajid Laghzali	Geophysical and geotechnical methods for the recognition of foundation and subsoil soilcase of the crushing center in Jorf Lasfar (EL jadida-Maroc)
P38	Yassir Sekkat	D- $\pi$ -A-type Phenothiazine Organic Dyes for Efficient DSSCs: A Theoretical Study on the Role of the $\pi$ -spacer
P39	Chaimae Ahsen	A thermal energy waste recovery methodologies and applications: case of tertiary buildings
P40	O. Zga	Geothermal potentials of improving energy efficiency in buildings in semi-arid climate: the pebbles bed thermal storage
P41	Sellam Abdellah	An ab-initio study of the adsorption of H <sub>2</sub> O, NaCl, and salt water on graphene and deformed graphene (under mechanical stress)
P42	A. Alaoui-Belghiti	Solid State Hydrogen Storage: Unlocking the Future of Clean Energy

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