Prof. Thierry Pauporté

Date of Birth: 16/07/1967 Nationality: French
Married, 2 children

Present position :
First-class Research Director at the French National Center of Research (DR1-CNRS)
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Academic degrees :

- 2007 : HDR, University P. et . Curie (UPMC) Paris VI, France.
- 1995 : PhD degree in Theoretical and Physical Chemistry, University Montpellier II, France.
- 1988-91 : "Elève Normalien" in Chemistry at the École Normale Supérieure de Lyon (BSc and MSc degrees).

Positions :

- 2010-present : Directeur de recherche CNRS (French National Center of Research).
- 1996-2010 : Chargé de recherche CNRS (French National Center of Research).

Main collective and official responsibilities :

- Head of the team "Photovoltaics, Optoelectronics and Nanostructures" (composed of 2 permanent scientists and 5 non-permanent scientists).
- Former leader of the "Nanostructured films and Electrolysis" group (Laboratoire d'Électrochimie et de Modélisation pour l'Énergie, UMR7575).
- Member of the Scientific Council of Chimie-Paristech.
- Member of the scientific committees of several symposia on perovskites, ZnO, Nanotechnology and thin film electrodeposition.
- Member of the editorial board of the International Journal of Photoenergy.
- Former expert for the "Observatoire National des Micro- et Nanotechnologies (OMNT)".

Research fields :

Dr. Thierry PAUPORTÉ has made original and innovative contributions to the synthesis, discovery, characterization and understanding of fundamental physical properties of oxide/organic-inorganic hybrid films and nanostructures. He is also interested in the integration of these films and structures in efficient devices and in their applications. His research is structured into the three key axes described as:

I. Nanostructured films preparation by solution-based techniques: electrochemical, chemical deposition, hydrothermal, chemical coating, spin-coating and sol-gel techniques. Oxide film and structure syntheses and characterizations. Hybrid perovskite preparation. Lead-Free perovskite materials.

II. Strategies for semiconductor surfaces and nanostructure functionalizing by organic and inorganic components (dyes, quantum dots, perovskite, electroactive molecules…). This includes modelling by DFT approaches.

III. Application and integration in devices of these advanced materials, including:
(i) Photovoltaic solar cells: Perovskite solar cells, Dye-Sensitized Solar Cell (DSSC), Quantum-dots solar cells.
(ii) Photoluminescence and Electroluminescence, Light emitting diodes (LEDs).
(iii) Photocatalysis, Wetting properties of surfaces.
(iv) Nanosensors and nanodetectors.

His research group is involved in many national and international collaborations in the framework of various research programs.

Main projects:

- Stable perovskite solar cells.
- Lead-less and lead-free perovskite solar cells.
- Nanosensors
- Oxide nanostructures.

Scientific production and activity (February 2023) :

- 215 publications in ISI referenced international journals (among them 8 review papers and 150 papers as corresponding author).
- 3 book chapters
- 5 Domestic/International patents, 17 reviewed proceedings, 15 publications in other journals,
- 280 communications in national and international meetings.
- **H-Index/ Citations : 58/ 9800 (Web of Science); 65/ 12250 (Google Scholar).**
- Supervisor of 26 PhD students, 26 master students, 6 post-doc fellows.
- Head of 13 industrial research contracts and 20 academic contracts.
- 26 invited stays in foreign institutions.

Equipments of his group : Potentiostat/Galvanostat, Impedance spectroscopy, Quartz crystal microbalance, Spin-coaters, UV/Vis/NIR spectrophotometer with an integrating sphere, Profilometer, Solar simulator, Spectral response system (EQE/IQE), Ovens, Furnaces, Polishing machines, Wire sew, Glove box for chemistry, Glove box for spin-coating, dry box for spin-coating, Thermal Evaporator, Sputtering system, High purity water system, Rotary evaporator, Spectrofluorimeter, Photoluminescence measurement bench, X-ray diffraction, SEM, Raman spectrometer, UV/O_3 system, ICP-AES, GD-OES…

Some recent publications (*= corresponding author):

- D. Zheng, F. Raffin, P. Volovitch, **Th. Pauporté**,* Control of perovskite film crystallization and growth direction to target homogeneous monolithic structures. *Nature Commun*., 13 (2022) 6655. https://doi.org/10.1038/s41467-022-34332-3.
- T. Zhu, S. Olthof, **Th. Pauporté***, Titanium dioxide Surface Energy Levels Tuning by Self-Assembled Monolayers. Appl. Phys. Lett. 121 (2022) 141602. DOI: 10.1063/5.0107202
- C. Lupan, N. Wolff, J. Drewes, H. Krüger, A. Vahl, **T. Pauporté**, O. Lupan, B. Viana, L. Kienle, F. Faupel, R. Adelung, S. Hansen, Nanosensors Based on a Single ZnO:Eu Nanowire for Hydrogen Gas Sensing. ACS Appl. Mater. Interfaces, 14 (2022) 41196−41207.
- D. Zheng, F. Chen, M.N. Rager, L. Gollino, B. Zhang, **Th. Pauporté***, What are Methylammonium and Solvent Fates upon Halide Perovskite Thin Film Preparation and Thermal Aging? Adv. Mater. Interfaces, 9 (2022) 2201436. https://doi.org/10.1002/admi.202201436
- B. Zhang, D. Gao, M. Li, X. Shang, Y. Li, C. Chen, **Th. Pauporté***, Heterojunction in-situ constructed by a novel amino acid-based organic spacer for efficient and stable perovskite solar cells. ACS Appl. Mater. Interfaces, 14 (2022) 40902–40912
- M. Li, H. Li, Q. Zhuang, D. He, B. Liu, C. Chen, M. Jiang, S. Xu, S. Zheng, B. Zhang, **Th. Pauporté**, Z. Zang, J. Chen, Stabilizing Perovskite Precursor by Synergy of Functional Groups for NiOx-Based Inverted Solar Cells with 23.5% Efficiency Angew. Chem. Int. Ed., 61 (2022) e202206914. DOI: 10.1002/anie.202206914
- D. Zheng, P. Volovitch and **Th. Pauporté**,* What Can Glow Discharge Optical Emission Spectroscopy (GD-OES) Technique Tell Us About Perovskite Solar Cell? *Small Methods* 18 (2022) 2200633. DOI: 10.1002/smtd.202200633
- D. Zheng, T. Zhu, Y. Yan, **Th. Pauporté***, Controlling the formation process of methylammonium-free halide perovskite films for a homogeneous incorporation of alkali metal cations beneficial to solar cell performances. *Adv. Energy Mater*., (2022) 2103618.
- D. Zheng, C. Schwob, Z. Ouzitb, L. Coolen, **Th. Pauporté**,* How Do Gold Nanoparticles Boost the Performance of Perovskite Solar Cells? *Nano Energy*, 94 (2022) 106934.
- D. Zheng, **T. Pauporté***, Control by Mixed-Chloride Additives of the Quality and Homogeneity of Bulk Halide Perovskites upon Film Formation Process. *J. Mater Chem. A* 9 (2021) 17801-17811. DOI: 10.1039/D1TA04651A
- L. Gollino, **Th. Pauporté**,* Lead-Less Halide Perovskite Solar Cells. *Solar RRL*, 5 (2021) 2000616.
- O Lupan, N. Ababii, D. Santos-Carballal, M.-I. Terasa; N. Magariu; D. Zappa, E. Comini, **Th. Pauporté**, L. Siebert, F. Faupel, A. Vahl, S. Hansen, N. H de Leeuw, R. Adelung, Tailoring the selectivity of Ultralow-Power Heterojunction Sensors by Noble Metal Nanoparticle Functionalization. Nano Energy, 88 (2021) 106241. https://doi.org/10.1016/j.nanoen.2021.106241
- T. Zhu, J. Su, J. Alvarez, G. Lefèvre, F. Labat, I. Ciofini, **Th. Pauporté***, Response Enhancement of Self-Powered Visible-Blind UV Photodetectors by Nanostructured Heterointerface Engineering. *Adv. Funct. Mater*., 29 (2019) 1903981
- A. Leblanc, N. Mercier, M. Allain, J. Dittmer, **Th. Pauporté**, V. Fernandez, F . Boucher, M. Kepenekian, C. Katan, Enhanced Stability and Band Gap Tuning of α-[$HC(NH_2)_2$]PbI_3 Hybrid Perovskite by Large Cation Integration. *ACS Appl. Mater. Interfaces*, 11 (2019) 20743-20751.
- D. Pitarch-Tena, T.T. Ngo, M. Vallés-Pelarda, **Th. Pauporté***, I. Mora-Seró, Impedance Spectroscopy Measurements in Perovskite Solar Cells. Device Stability During the Measurement and Noise Reduction. *ACS Energy Lett*., 3 (2018) 1044−1048.

- M. Ulfa, P. Wang, J. Zhang, J. Liu, W. Daney de Marcillac, L. Coolen, S. Peralta, **T. Pauporté***, Charge Injection and Electrical Response in Low Temperature SnO_2-Based Efficient Perovskite Solar Cells. *ACS Appl. Mater. Interfaces*, 10 (2018) 35118–35128.
- M. Ulfa, T. Zhu, F. Goubard , **Th. Pauporté***, Molecular versus Polymeric Hole Transporting Materials for Perovskite Solar Cell Application. *J. Mater. Chem. A*., 6 (2018) 13350 - 13358
- P. Wang, M. Ulfa, **T. Pauporté**,* Effects of Perovskite Monovalent Cation Composition on the High and Low Frequency Impedance Response of Efficient Solar Cells. *J. Phys. Chem. C*, 122 (2018) 1973−1981.…

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