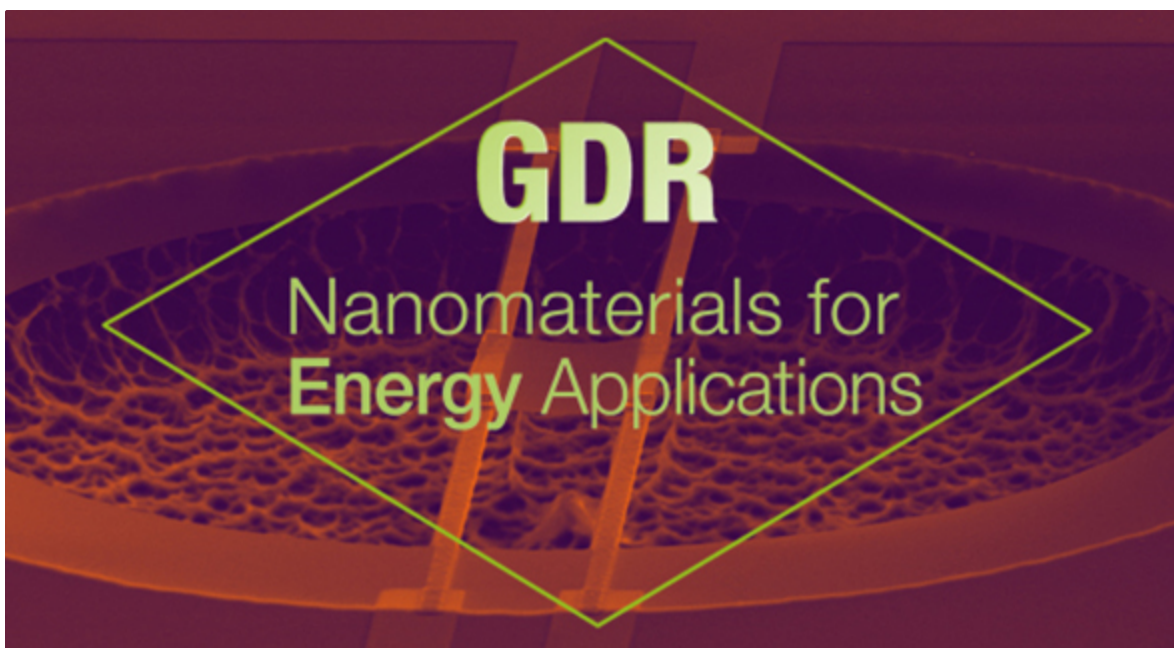


GDR-NAME Newsletter

september, 2021

N A M 

GDR Nanomaterials for Energy Applications



EDITO

Dear partners

We hope that you had a nice summer time. We are all back to work without (we hope so) too many disturbances from the Covid.

The next big objective of our community will be the GDR plenary session planned from Monday 4th to Wednesday 6th of October at ESIEE engineering school. We hope to see you there and to have a first real-time and real-space interaction with you, with fruitful exchanges on nanomaterials for energy application, the white paper and all presentations of the workshops organized as well as our distinguished invited talks. Please check the following link for more information.

We are looking forward to meet you there !

LINK

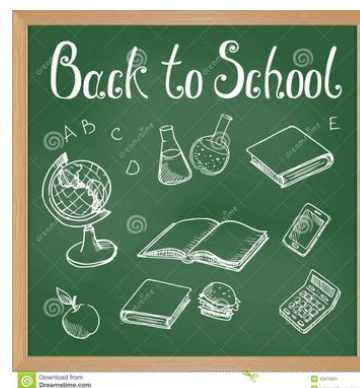
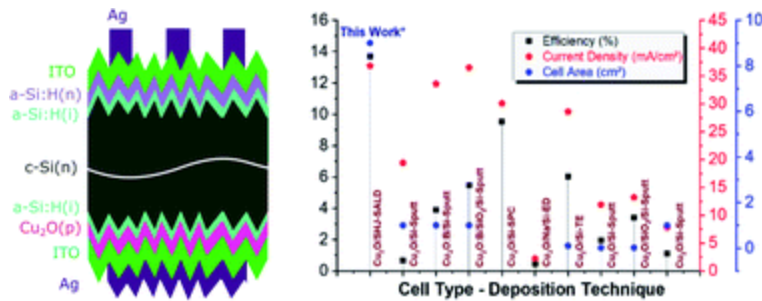


IMAGE OF THE MONTH

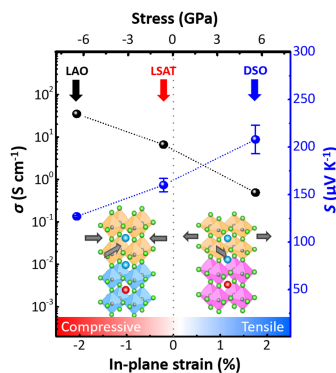


Solar cells : Open-Air, Low-Temperature Deposition of Phase Pure Cu₂O Thin Films as Efficient Hole-Transporting Layers for Silicon Heterojunction Solar Cells.

... For more information, read the scientific highlight !!

[LINK](#)

Scientific highlights



Tuning thermoelectricity by epitaxial strain in (La,Sr)CrO₃

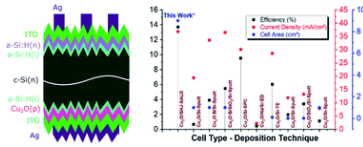
The electronic and thermoelectric properties of p-type semiconducting transparent (La,Sr)CrO₃ can be largely tuned by epitaxial strain.

La_{1-x}Sr_xCrO₃ (LSCO) solid solutions of perovskite structure are of high interest for numerous application fields because of their key original properties (p-type semiconducting, transparent, thermoelectric). In addition to their property tuning by cationic substitution x (La³⁺ by Sr²⁺), we have shown in LSCO ($x = 0.25$) thin films epitaxially grown by molecular beam epitaxy (MBE) that their physical properties can be also largely tuned by epitaxial strain. In the in-plane strain range of $\pm 2\%$, the electrical conductivity can be controlled over two orders of magnitude (0.5 S/cm in tension and 35 S/cm in compression). Consistently, the Seebeck coefficient can be tuned almost within a factor two (127 $\mu\text{V/K}$ in compression and 208 $\mu\text{V/K}$ in tension).

Consequently, the thermoelectric power factor can be tuned over two orders of magnitude, with enhancement in compression. These results are of high interest for advanced LSCO-based devices.

Dong Han, R. Moalla, I. Fina, V.M. Giordano, M. d'Esperonnat, C. Botella, G. Grenet, R. Debord, S. Pailhès, G. Saint-Girons, and R. Bachelet, "Giant Tuning of Electronic and Thermoelectric Properties by Epitaxial Strain in p-Type Sr-Doped LaCrO₃ Transparent Thin Films", ACS Applied Electronic Materials (2021)

[LINK](#)



Open-air, low-temperature deposition of phase pure Cu₂O thin films as efficient hole-transporting layers for silicon heterojunction solar cells

Recent research focuses on finding alternative materials and fabrication techniques to replace traditional (p) and (n) doped hydrogenated amorphous silicon (a-Si:H) to reduce cost and boost the efficiency of silicon heterojunction (SHJ) solar cells. In this work, low-cost p-type Cu₂O thin films have been investigated and integrated as a hole-transporting layer (HTL) in SHJ solar cells, using atmospheric-pressure spatial atomic layer deposition (AP-SALD), an open-air, scalable ALD approach. Phase pure Cu₂O thin films have been deposited at temperatures below the degradation limit of the SHJ, thus maintaining the passivation effect of the a-Si:H layer. The effect of deposition temperatures and HTL thicknesses on the performance of the devices has been evaluated. The fabricated Cu₂O HTL-based SHJ cells, having an area of 9 cm², reach a power conversion efficiency (PCE) of 13.7%, which is the highest reported efficiency for silicon-based solar cells incorporating a Cu₂O HTL.

Van Son Nguyen, A. Sekkat, D. Bellet, G. Chichignoud, A. Kaminski-Cachopo, D. Muñoz-Rojas and W. Favre J. Mater. Chem. A, **9**, 15968-15974 (2021)

[LINK](#)

GDR-NAME NEWS

GDR-NAME Plenary meeting at ESIEE close to Paris !



Plenary session at ESIEE, *please register asap* 4-5-6 of october 2021

registration deadline is 9/24/21. Check the final program is at <https://gdrname.wordpress.com/2021/05/28/reunion-pleniere-du-gdr-2021/>.

N.B: The abstract for A0 poster presentations should be sent to gdr-name-request@services.cnrs.fr by September 24th. All information about the meeting are available on the GDR website: <https://gdrname.wordpress.com/2021/05/28/reunion-pleniere-du-gdr-2021/>

The preliminary programme of the plenary meeting includes presentations of the 2021 PhD thesis awards, selected scientific presentations as well as round tables by axis and themes of the GDR.

LINK

White Paper: Writing down



Six workshops on related subjects to the Nanomaterials for Energy

The next step after the Atelier is to start writing the white paper, instruction will follow !

- 1. Nanomaterials-Nanostructuration** (contact person: Severine Gomes, severine.gomes@insa-lyon.fr)
- 2. Transport properties at nanoscale** (contact person: Valentina Giordano, valentina.giordano@univ-lyon1.fr)
- 3. Energy Conversion** (contact person: Romain Bachelet, romain.bachelet@ec-lyon.fr)
- 4. Thermal and Energy Management** (contact person: Younes Ezzahri, younes.ezzahri@univ-poitiers.fr)
- 5. Energy Storage** (contact person: Thierry Brousse, thierry.brousse@univ-nantes.fr)
- 6. Micro-Nano-Devices** (contact person: Philippe Basset, philippe.basset@esiee.fr)

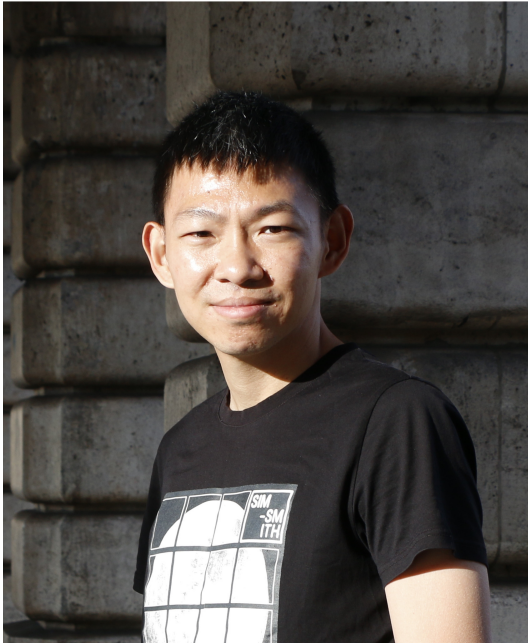
The idea is to paint a complete state of the art on the priority themes of the GDR at the beginning of its existence. The drafting of a White Paper will follow during fall 2021 and hopefully it will be ready for the beginning of 2022.

We deeply thank all the participants !!

GDR-NAME THESIS PRIZES

2021 GDR NAME thesis prizes: congratulations to the two laureates. They will present their work at the GDR plenary

session at ESIEE in October 2021 !!



**2021 Best PhD Thesis Award,
Prize #1 Zhelu HU (LPEM,
ESPCI Paris)**

**Investigations Towards More
Performing and More Stable Solution-
Processed Hybrid Perovskite Solar
Cells** (hu.zhelu@espci.fr)

Up to now, the certified power conversion efficiency (PCE) of state-of-the-art single-junction perovskite solar cells has exceeded 25%, suggesting their great potential to compete with silicon solar cells. Despite the excellent efficiency achieved and the advantages in solution-processed fabrication, important steps are still needed for perovskite solar cells (PSCs) to reach industrialization and large-scale application. Fundamental research in perovskite solar cells is thus necessary in order to fully understand their photovoltaic properties, and the impact of transport layer, the active layer, and the interfaces on device properties and stability.

[LINK](#)



**2021 Best PhD Thesis Award,
Prize #2 Giulia LOMBARDI
(INSA, Lyon)**

**Unified nonlinear electrical interfaces
for hybrid piezoelectric-
electromagnetic small-scale harvesting
systems** (giulia.lombardi@insa-lyon.fr)

Recent advances in wireless communication techniques, the miniaturization of microprocessors and the improvement of measurement techniques have led to the spread of autonomous sensor networks that communicate wirelessly.

One of the main constraints when designing a system able to power small sensor nodes is its compactness: in most of the cases, a miniaturization of the transducing system involved in the process of energy conversion leads to lower mechanical couplings and, therefore, lower output power.

[LINK](#)

ANNOUNCEMENTS

Events, Conferences, workshop etc...!!!



N A M E

GDR Nanomaterials for Energy Applications

GDR-NAME Plenary Meeting, 4-6/10/21, Paris

The Plenary Meeting will be held at ESIEE from the 4th to the 6th of October, 2021 at Noisy-le-Grand, please reserve the date now ! Scientific presentation, restitution of the working group on the White Book, laboratory presentation and much more, good food, good wine ...new contacts guaranteed !

Registrations for the next GDR meeting from October 4 to 6 at ESIEE Paris are now open!

The registration link via the azur-colloque platform is: <https://www.azur-colloque.fr/DR07/inscription/fr> The registration deadline is 9/24/21. Check the final program is at <https://gdrname.wordpress.com/2021/05/28/reunion-pleniere-du-gdr-2021/>.

N.B: The abstract for A0 poster presentations should be sent to gdr-name-request@services.cnrs.fr by September 24th. All information about the meeting are available on the GDR website: <https://gdrname.wordpress.com/2021/05/28/reunion-pleniere-du-gdr-2021/>

LINK



POSTPONED NEW DATES !!

C'NANO meeting, 23-25/11/21, Toulouse

For the fourth consecutive year, the French national Competency Cluster in Nanoscience of CNRS, C'Nano, organizes its annual international meeting in nanoscience.

C'Nano 2020 The Nanoscience meeting aims at gathering the scientific communities in nanoscience and nanotechnology, and will take place in Occitanie region (France) at the

Pierre Baudis Congress Center in Toulouse from 23rd to the 25th of November 2021.

Last minute information: the conference has been postponed for the second time, please check the website for more!

LINK

**La culture revient !! Cinémas, musées et salles
de concert sont ouverts, profitez en avec le
passe sanitaire bien sûr !!!**

You have received this email because you have subscribed to the GDR mailing list.

Don't forget to submit your announcements, proposals for highlights, image of the month, information of all types... Thank you!



© 2021 GDR Name