

Ph.D. position in Perovskite Solar Cells

(Location: Taiwan; Supervisor: Prof. Y. Galagan)

Research background

Continuous increase in energy demand for our society requires decarbonization of the energy sector and solving the global climate change challenge. Therefore, critical steps now are the reduction of fossil fuel consumption and the development of renewable energy technologies. Photovoltaic (PV) technologies have a very low environmental impact, offering the potential to transform our society into a low-carbon economy and preventing climate change. The emerging photovoltaics have been greatly developed in the last few years, where hybrid organic-inorganic perovskite solar cells (PSCs) demonstrate very promising results in terms of cost and efficiency and compete with conventional Si-based technologies. The power conversion efficiency of PSCs raised to 25.5% only for ten years of development. Despite substantial progress that has been made in terms of efficiency, still a lot of research and developments need to be done before the commercialization of the perovskite technologies.

Projects Description

We offer an opportunity for Ph.D. students to join our international team and work together on a number of challenging topics related to perovskite solar cells. The research focus of the group covers a wide range of perovskite solar cell aspects from fundamentals to practical application. We have several projects on the following topics: (i) optimization of generic device stack, providing high efficiency and long operational stability; (ii) development of low temperature processed interfacial materials and highly conducting transparent electrodes; (iii) development scale-up technology for perovskite PV modules using a slot die coating process; (iv) development of flexible and light-weight perovskite solar cells; (v) semitransparent solar cells; (vi) multijunction (tandem) photovoltaic devices, etc.

The work will be performed at the Department of Materials Science and Engineering at National Taiwan University (Taipei, Taiwan), in the international group under the supervising of Prof. Yulia Galagan ([Yulia Galagan - Google Scholar](#)) ([Yulia Galagan - 國立台灣大學材料科學與工程學系暨研究所 \(ntu.edu.tw\)](#)).

Qualification requirements

We are looking for talented, motivated, and enthusiastic Ph.D. students who meet the following requirements:

- MSc degree in materials science and engineering, chemical engineering, physics, chemistry, nanotechnologies, or closely related fields.
- Prior knowledge in materials synthesis, materials characterization, device fabrication/characterization.
- Ability to independently work within a dynamic team and multidisciplinary research environment.
- Fluent in spoken and written English

Preference will be given to the candidates with:

- The experience in manufacturing and characterization of solar cells,
- Experience in syntheses, characterization, and application of metal oxide semiconductors and perovskite materials
- Experience in writing and publishing research papers and presenting research results at international conferences.
- High motivation and enthusiasm.

Tasks and Responsibilities

- Take several department/university courses required for getting a Ph.D. qualification.
- Make detailed planning of the experimental work and conducting the experiments.
- The experimental work involves experimental studies of the properties of photovoltaic materials, charges transporting materials, and other interface materials required for the fabrication of perovskite photovoltaic devices.
- Fabrication of materials and perovskite photovoltaic solar cells using different deposition methods such as spin coating, doctor blading, slot die coating, thermal evaporation, and sputtering.
- Conduct the measurements of the photovoltaic devices and individual layers using a variety of electrical and optical techniques.
- Report results at group meetings, prepare scientific papers and conference presentations.
- Daily supervision of BSc and MSc students.

What we offer

We offer a dynamic ecosystem with a supportive environment and passionate colleagues. The candidates will be specifically trained on materials syntheses, characterization, device fabrication, and evaluation of photovoltaic properties of the devices. The candidates will gain a variety of scientific knowledge, ranging from chemistry, materials science, physics, nanotechnologies, engineering, device manufacturing, etc. Special attention will be paid to bridging the gap between excellent scientific research and industrial needs. The proposed research program will educate young researchers to translate their research into real applications, practices, and technologies.

The Ph.D. program will start in August 2021, while the application process will be closed in the mid of March. There are several NTU, and government-supported scholarships are available for international Ph.D. students. More information on the scholarships can be found here: [Office of International Affairs, NTU](#). The information regarding the cost of living in Taiwan can be found here: [Office of International Affairs, NTU](#).

Location

Taiwan, the home of NTU, is located right in the heart of East Asia, making it the perfect location from which to explore East and Southeast Asia. Surrounded by blue oceans and dotted with towering mountains and lush forests, Taiwan offers stunning nature and is home to unique endemic species. Successive waves of migration and colonization have resulted in a rich cultural and linguistic variety and unique Taiwanese culture as people from all over the Asia-Pacific region have settled in Taiwan.

More information about life in Taiwan and studying at NTU you can find here: [Office of International Affairs, NTU](#)

Information and application

Do you recognize yourself in this profile and would like to apply, or would you like to know more? Please contact Prof. Yulia Galagan, e-mail: ygalagan@ntu.edu.tw

The Application Should Include the following documents:

- Brief cover letter describing your motivation and qualifications for the position, along with career goals, research interests, and research experience.
- Curriculum vitae, including a list of your publications and the contact information of three references.
- Academic records (please provide English translation if transcript is in another language).