

European materials initiative wins prestigious Royal Society of Chemistry Prize for developing solar cells with self-adjusting transparency



The PISCO team has been named winner of one of the Royal Society of Chemistry's Horizon Prizes, which celebrate discoveries and innovations that push the boundaries of science.

The multinational collective has won the Materials Chemistry Horizon Prize for the development of new photochromic dyes for use in semi-transparent solar cells with light transmittance that adapts to illumination conditions.

The group, which is made up of scientists from CEA-IRIG in France and collaborators from Pablo de Olavide University in Spain, CNRS in France, and Solaronix in Switzerland, will receive a trophy, while each team member will also get their own special individual token. To help others learn from their experiences, they will also be the subjects of a special video showcasing the fruits of their labour.

Summarising the team's work

The urgency of climate change is forcing us to rethink the way we produce and consume energy. Central to this transition is the development of sustainable technologies, such as photovoltaics, that can be deployed on a large scale.

However, efficient photovoltaic devices need to absorb as many solar photons as possible, which limits their transparency in the visible spectrum. This poses a significant challenge for applications such as glazing, building facades and agrivoltaics, where a balance between transparency and energy efficiency is essential.

To overcome this, the team has developed innovative photochromic dyes for use as photosensitisers in dye-sensitised solar cells (DSSCs), enabling solar cells with dynamically variable transparency. Photochromic dyes are molecules that reversibly change colour in response to light. Incorporated into DSSCs, these dyes create photochromic solar cells that remain transparent in low light and automatically darkens under intense illumination, improving power generation without external control.

Through molecular engineering, the team has improved these dyes to achieve faster switching between coloured and bleached states and a higher colour rendering index for improved visual comfort. This work demonstrates the feasibility of combining two functions that are typically difficult to reconcile – photochromism and photovoltaics – within a single device and using a single molecule. It represents a major step towards dynamic, energy-generating windows for the next generation of buildings and infrastructure

Reacting to the award win

After receiving the prize, Dr Renaud Demadrille said: "I am particularly proud to receive this award because it recognises not just one individual, but the entire team I have had the pleasure of working with over the past five years."

Diego Mirani added: "I am truly honoured and thrilled that our group is receiving this prize, as it highlights the strong cohesion and collaboration we maintained throughout the project and across its various aspects. It is deeply rewarding to have our collective efforts recognised in this way."

"I'm really grateful to be part of the team that won this award!" noted Johan Liotier. "It recognises research that has been shaped by diverse experiences – from PhD students to group leaders – and I'm proud to have contributed to both the work and the team behind it!"

Juan Anta added: "Sincere satisfaction for the recognition of what I always considered cutting-edge work, done in collaboration with brilliant and very professional colleagues."

Antonio Riquelme said: "I am grateful to have received this recognition for our collective work to open new frontiers in the development of emerging photovoltaic technologies. I am proud to belong to this research group and I consider this award as an indication that we are doing a good job and that this is the way forward."

Dr Helen Pain, Chief Executive of the Royal Society of Chemistry, said:

"The chemical sciences cover a rich and diverse collection of disciplines, from fundamental understanding of materials and the living world, to applications in medicine, sustainability, technology and more. By working together across borders and disciplines, chemists are finding solutions to some of the world's most pressing challenges.

"Our prize winners come from a vast array of backgrounds, all contributing in different ways to our knowledge base, and bringing fresh ideas and innovations. We recognise chemical scientists from every career stage and every role type, including those who contribute to the RSC's work as volunteers. We celebrate winners from both industry and academia, as well as individuals, teams, and the science itself.

"Their passion, dedication and brilliance are an inspiration. I extend my warmest congratulations to them all."

Recognising excellence in the chemical sciences

The Royal Society of Chemistry's prizes have recognised excellence in the chemical sciences for more than 150 years. This year's winners join a prestigious list of past winners in the RSC's prize portfolio, 60 of whom have gone on to win Nobel Prizes for their work,

including 2022 Nobel laureate Carolyn Bertozzi and 2019 Nobel laureate John B Goodenough.

The Horizon Prizes highlight exciting, contemporary chemical science at the cutting edge of research and innovation. These prizes are for groups, teams and collaborations of any form or size who are opening up new directions and possibilities in their field, through ground-breaking scientific developments. Other prize categories include those for Research & Innovation, those for Education (announced in November), the Inclusion & Diversity Prize, and Volunteer Recognition Prizes.

For more information about the RSC's prizes portfolio, visit rsc.li/prizes.

NOTES FOR EDITORS:

About the Royal Society of Chemistry

We are an international organisation connecting chemical scientists with each other, with other scientists, and with society as a whole. Founded in 1841 and based in London, UK, we have an international membership of more than 60,000 chemical scientists. We use the surplus from our global publishing and knowledge business to give thousands of chemical scientists the support and resources required to make vital advances in chemical knowledge. We develop, recognise and celebrate professional capabilities, and we bring people together to spark new ideas and new partnerships. We support teachers to inspire future generations of scientists, and we speak up to influence the people making decisions that affect us all. We are a catalyst for the chemistry that enriches our world.

The Royal Society of Chemistry's Prizes portfolio is one of the oldest and most prestigious in the world, recognising achievements by individuals, teams and organisations in advancing the chemical sciences. We reward those undertaking excellent work in the chemical sciences from across the world.

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