

# "CORROSION AND ELECTROCHEMISTRY ARE KEY TO SOLVE THE PROBLEMS OF THE FUTURE"



**For nearly 25 years, Dr Michael Rohwerder, has addressed the fundamental questions of corrosion science - and he's not resting on his laurels after being awarded the prestigious European Corrosion Medal**

With an impressive list of accolades and achievements that includes nearly 25 years at the Max-Planck-Institut, the award of a laboratory from the Christian Doppler Society, and the publication of more than 200 peer-reviewed papers, some might be forgiven for taking their foot off the gas, but not this year's recipient of the EFC's European Corrosion Medal, Dr Michael Rohwerder, who has an infectious enthusiasm for the future.

The award of the European Corrosion Medal for 2023 recognises Dr Rohwerder's exceptional research that has greatly contributed to the understanding of fundamental corrosion mechanisms, while his understanding of organic and metallic coating failures and degradation has ensured he is widely recognised by all in academia and industry for his contributions to the development to sustainable ideas in organic coatings. And, there's more to come

"Organic coatings are still fascinating, but I think not all is solved," explained Dr Rohwerder, who has been the Group Leader of Corrosion, Department Interface Chemistry and Surface Engineering at the Max-Planck-Institut für Eisenforschung GmbH in Düsseldorf, Germany, since 2000. "For example, we have understood now very fundamental processes of corrosion driven coating delamination, but we are still lacking information needed for reliable computer simulated modelling. There are still aspects missing. It's of course because coatings are complex, especially the interface is still not well enough investigated. How does it really look like on the molecular and nanoscopic scale?"

"It's difficult to characterize, but there are so many things to do still. And I think it's important that we go further and try to build on the midterm scale so that we are able to do computer-based simulation of corrosion phenomena."

Many questions remain for Dr Rohwerder and it's this curiosity in corrosion science, and science as a whole, that's driven him to become a well-respected figure within the corrosion community who hosts lectures at leading

conferences in electrochemistry and corrosion science, and has been a key contributor in industry projects. And, like so much that Dr Rohwerder undertakes, enthusiasm is at the heart of his approach to corrosion science. It's infectious. His enthusiasm reflects a career following a passion and a determination to make a difference in a changing society.

## MODERN CHALLENGES

"I'm somebody who wants to know that the research I'm doing is of use. We are currently facing many problems as a society as we try to move away from CO<sub>2</sub> and go towards more sustainability in general. Preventing corrosion or at least elongating the lifetime of goods and infrastructure is a huge factor in this context. And we see many corrosion related problems in technologies for green energy production, such as electrolyses. Solving them is key to making the transition a success."

This curiosity stems from a fascination with science that dates back to a long-held curiosity of physics and a desire to gain a deep understanding of his drive to make a difference in society. And now with the award of the European Corrosion Medal, which he will be presented with at EUROCORR in Brussels, Dr Rohwerder has another platform to not only share his decades of experience, but his enthusiasm too.

"I think one can say that this recognition strengthens my position when applying for research funding and grants. Funding agencies often prioritize individuals with a proven track record of excellence, and winning the European Corrosion Medal certainly bolsters my chances of securing financial support for future research endeavours.

"The enhanced visibility coming with the medal also provides a gateway to connect with leading experts, researchers, and industry professionals in the field of corrosion science who are specialized in other topics than I am. They might say 'what he's doing is interesting for us too!' That may lead to new collaborations and new synergies."

For Dr Rohwerder, this fascination developed from a young age and lit a fire of interest for the future corrosion scientist, who remains fascinated by the possibilities of science.

"I can't remember why exactly I studied physics. It was not for a single reason, but I know one reason was that I wanted to understand things from the basics. That now sounds a little spiritual," jokes Dr Rohwerder, as he pauses to reflect. "This was the era of New Age and I wanted to understand things at the deepest level. So, I studied physics and when I graduated I looked for something to further myself in science.

"And then, I got accepted as a PhD student at the Max-Planck-Institut. There I started to focus on corrosion science and found it very, very interesting. After my dissertation, I held a postdoc at the University of Austin, USA to deepen my knowledge in electrochemistry, where I joined a renowned electrochemistry group headed by Professor A.J. Bard. He wrote some of the standard textbooks for electrochemistry and was working at the very frontiers of that research field, so it was an interesting time. After that I joined Prof. M. Stratmann at the University of Erlangen (Germany) to build up a high temperature oxidation group, which was another change of focus."

"Then I went back with him to the Max-Planck-Institut and helped establish the Department of Interface Chemistry and Surface Engineering. I learned many aspects of corrosion, electrochemistry, surface treatments, and more. It was very inspiring and it still is! I've continued working on many of these research topics and now I have to decide where to draw my attention. Corrosion science is so broad now and all of the topics are so important. Certainly, one topic will be hydrogen and its interaction with materials. We have developed a highly sensitive technique with high spatial resolution for detecting hydrogen that might play a

crucial role in unravelling detrimental effects of hydrogen, such as hydrogen embrittlement of high-strength alloys, but may also be helpful in investigating effects related to the storage and transport of hydrogen, for example."

Corrosion science is clearly a deeply held passion for Dr Rohwerder that hasn't faded. Instead, this desire to make a change to society through the advancement of corrosion science has only grown over time. And, after two decades his position within the corrosion community is one of a well respected figure. His research provides inspiration for many, especially young corrosionists. It's his enthusiasm that really comes across though, which can only add to any prospective corrosion scientist's interest. This isn't to say that Dr Rohwerder is single minded in his support for organic and metallic coatings, for example, as he believes there are still many challenges facing corrosion science. And perhaps unusually for a scientist who has built an career on qualitative research, he recommends that the next wave of scientists to follow their heart.

"If you're interested in technology, if you're interested in achieving something, then science is a great field. And corrosion and electrochemistry, I would say, are key disciplines to solve the problems of the future related to transforming our economies and reducing CO2 output to help create a more sustainable future.

"We have to succeed now and make a transformation or we fail to make an impact on society as corrosion scientists. That is of course scary, but it also means there are a lot of things to do. And, if you're an optimistic person and we do our best, then hopefully we succeed together. So, whether it's applied or fundamental, whether it's electrochemistry or corrosion, I think they should do what they have a passion for as they will find some interesting questions, for sure. And they will not have to worry about finding a good position."

### WHAT IS THE EUROPEAN CORROSION MEDAL?

The European Corrosion Medal recognises achievements by a scientist in the application of corrosion science. The annual award consists of a bronze medal, diploma, and a €1,000 prize. The ceremony will take place at the EUROCORR 2023 opening session on Monday 28 August, prior to Dr Rohwerder's Plenary Lecture titled, ***Sustaining Tomorrow: The Crucial Role of Corrosion***

The Max-Planck-Institut für Eisenforschung (right) in Düsseldorf, Germany where Dr Michael Rohwerder has addressed the fundamental questions of corrosion science since 2000 as the Group Leader of Corrosion, Department of Interface Chemistry and Surface Engineering

