

Position Description

Group of research topics: Novel concepts for self-healing organic coatings

Position is funded by	<ul style="list-style-type: none"> - COFUND, Marie Skłodowska-Curie Actions (MSCA), Horizon 2020, European Union - Max-Planck-Institut, Germany - BASF Coatings GmbH, Germany - RMIT University (RMIT), Australia
Research Host	Max-Planck-Institut für Eisenforschung GmbH
PhD awarding institution/s:	Dual PhD awarded by Ruhr-Univ. Bochum, Faculty of Mechan. Engineering and RMIT
Locations	<ul style="list-style-type: none"> - Primary: Düsseldorf, Germany - Secondary: Melbourne, Australia - Annual workshops in Barcelona, Spain
Contract	Full time, fixed term (48 months)
Gross annual salary	34-42.000 EUR
Preferred start date	01/01/2023 (tentative)
Deadline for applications	19/09/2022 (Reference: MPIE/BASF-DC1)

Your choice of research topics (only one of these projects will be funded):

Project 1: Self-Healing organic coatings: the delaminated interface	Project 2: Re-enforcing the protection of zinc oxides via novel inhibitors	Project 3: Active protective coatings utilizing carrier-release concepts
<p>In self-healing coatings, the self-healing will take a while to set in. During this time the coating will continue to delaminate. That requires that it will have to be restored in its functions of inhibiting corrosion and providing strong adhesion between coating and metallic substrate. It is proposed to carry out a dedicated project focussing at this interface in order to provide both a better general understanding as well as approaches how to obtain optimized self-healing. MPIE is ideally equipped to tackle this important problem, that has been widely neglected so far.</p>	<p>Traditionally zinc and galvanised steel have been protected by inhibitors within coatings surface will have a thin oxide layer. However, in designing the inhibitor system the oxide layer is not considered a design variable. Here, it is proposed to look in how far the oxides can be tuned to perform better, ideally in combination with inhibitors. A suitably porous structure could act as a reservoir for the inhibitor and be used to seal any defect that develop in the compact layer while promoting densification of the porous layer and being available for migration to larger scale defects.</p>	<p>Smart engineering materials capable to mimic sense-release properties are commonly found among living organisms and of rapidly raising interest for designing protective coatings. The project proposes a comparative study of suitable carrier-release concepts regarding different triggers and release kinetics of the stored corrosion inhibitors. Such protective coatings could have different protective mechanisms, like the release of corrosion inhibitors into a defect or stabilisation of the coating/substrate interface. Ideally both mechanisms will facilitate to a durable protective coating.</p>

Supervisors: Dr. Michael Rohwerder (MPIE, RUB) and: Ivan Cole (RMIT) and: Patrick Keil (Industry supervisor)		
Research Fields: Applied Science, Chemistry, Chemical Engineering, Nanotechnology, Environmental and sustainable engineering		

For more information on the Projects, contact us: redi.help@rmit.edu.au

Are you REDI? (Expected Profile)

For all projects

Your background and skills: Background in Chemistry, Physics, Physical Chemistry and/or Materials Science. Interest in experimental work. Ideally also knowledge of Electrochemistry and some experimental experience therein.

Your work experience: Not required

Your research experience: Not required

For more information about the general conditions of the REDI Program and the Eligibility Criteria, please visit: <https://www.rediprogram.eu/>

Employment Benefits and Conditions

MPIE offers a 48-months full-time work contract, indicatively starting on 01/01/2023. The position will be based in Düsseldorf (Germany). International travel is foreseen, including to Australia (up to 12 months) and Spain (one week per year). At MPIE, there is a probation period of six 6 months and there are 39 working hours per week.

The remuneration, in line with the European Commission rules for Marie Skłodowska-Curie grant holders, will at the beginning consist of a gross annual salary of about 34-42.000 EUR gross per year. Of this amount, the estimated net salary to be perceived by the Researcher at the beginning will be 1.780-1.950 EUR per month. However, the definite amount to be received by the Researcher is subject to national tax legislation.

Benefits include:

- All benefits according to the German public service tariff system (TVÖD), such as paid holiday leave, sick leave, parental leave
- 1,000€ yearly travel allowance to cover flights and accommodation to participate in the annual workshop at RMIT Europe in Barcelona (Spain).
- 10,000€ allowance to cover flights and living expenses for up to 12 months in Australia.

For more details, please see: www.mpie.de



Learn more on [RMIT](#), [MPIE](#), [RUHR-UNIV. BOCHUM](#) and [BASF](#) on our website:
<http://www.rediprogram.eu/about/#hostinstitutions>

Successful candidates for this position will be enrolled by the following institutions:

Admission at MPIE

You will be enrolled as Doctoral Student at MPIE for the entire duration of the assignment. At admission, you will need to supply:

- CV
- Cover Letter
- Complete transcripts for all academic qualifications (including bachelor and master certificates)
- Research proposal or statement of interest in an available research project

It is essential that the candidate have a Master's degree for starting PhD work at MPIE.

Admission at RUHR-UNIV. BOCHUM

You will also need to be enrolled as a Doctoral Student at RUB for the entire duration of the assignment. At admission, you will need to remember:

- (1) Admission to doctoral studies shall be granted to candidates with a Master's degree in Chemistry, Physics, Materials Sciences or Chemical Engineering.
- (2) Admission to doctoral studies shall be dependent on proof of a qualified degree. A degree is considered qualified if the applicant belongs to the 35 % best of a graduation period of at least one year. The doctoral committee may allow exceptions upon application. Further academic achievements as well as other achievements which indicate suitability for a doctorate shall be proven by the applicant at the request of the doctoral committee. You do not need to supply proof of these other achievements at the time of applying.
- (3) Additional studies preparing for doctoral studies shall be determined by the doctoral committee in consultation with the applicant and the supervisors with regard to content, scope, evidence of achievement to be provided, the level of quality to be achieved and the period of time for the provision of such evidence.
- (4) The same requirements shall apply to applicants who have obtained their degree in countries outside the European Union, provided that the equivalence of the degree has been established. The doctoral committee shall decide on the equivalence of degrees on the basis of intergovernmental agreements, the classification of the higher education institution at which the degree was obtained and on the basis of agreements with partner higher education institutions. If there is any doubt as to the equivalence, the Zentralstelle für ausländisches Bildungswesen (Central Office for Foreign Education) shall be consulted.
- (5) Admission to doctoral studies is dependent on proof of sufficient knowledge of German or English.

Admission at BASF

No additional requirements

Admission at RMIT University

You will also be enrolled as Doctoral Student at RMIT for the entire duration of the assignment. At admission, you will need to supply:

- CV
- Complete transcripts for all academic qualifications
- Research proposal or statement of interest in an available research project
- Language certificates
- List of referees

More information: <https://www.rmit.edu.au/research/research-degrees/how-to-apply>

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