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Preface

Corrosion is the reaction of a material with its environment resulting in a degradation of the material. 4% of the gross national product (GNP) of each country are lost annually through corrosion. In 2012 the GNP of Austria was € 310 billion. The annual economic loss due to corrosion in Austria amounts to € 12 billion. In comparison, the annual expenses for administration in Austria are € 10 billion, for traffic and streets € 6.5 billion, for education € 7.7 billion, for science and research € 4.5 billion, and for legal and state security and national defense € 5.3 billion. In other words, Austria loses the same amount of money per year due to corrosion as it spends on education, science, and research altogether. In Germany the cost of corrosion is 10 times higher and in the USA approximately 40 times higher than in Austria.

The cost of corrosion is that high due to the thermodynamic instability of most metals and alloys (except precious metals). Although metals are unstable, still a quarter of the total cost of corrosion can be avoided by applying proper measures against corrosion, by choosing proper alloys under given conditions, and by generating knowledge on corrosion mechanisms and properties.

The present special edition of BHM is dedicated to corrosion research. In Austria the field of corrosion was developed in the 60s, 70s, and 80s by Prof. Dr. Herbert Zitter. He is the father of Austrian corrosion research and is still very frequently cited and well known for his breakthrough research in surgical implants and fundamental works on localized corrosion (stress corrosion cracking and pitting corrosion). Maybe his biggest achievement was the setting of a minimum PREN value for surgical implants that has also been taken over by American standards and has found worldwide acceptance.

In Austria there is currently no Chair for Corrosion in either of the three technical universities (Vienna, Graz, Leoben). While, in Vienna and in Leoben, an Associate Professor is responsible for teaching and research, there has been no focus on corrosion research in Graz for many years.

Corrosion research in Vienna focuses on microbial induced corrosion especially with manganese oxidizing

microorganisms. The second focal point on corrosion research in Vienna is electrochemistry. In Leoben corrosion research has set its focus on stress corrosion cracking, corrosion fatigue, and erosion corrosion as well as on corrosion of passive alloys. In recent years in the frame of the CD Laboratory of Localized Corrosion at Montanuniversitaet Leoben, a stable and active working group has been established, which is strongly recognized internationally. Over 20 PhD theses on corrosion research have been finished or co-supervised in the last 10 years at the Montanuniversitaet Leoben.

Financing happens mainly through industrial projects in the framework of different funding programs. The total turnover of the Leoben corrosion group is € 1 million per year resulting in remarkable equipment especially for testing materials with respect to mechanically influenced types of corrosion. The author is especially grateful to the Head of the Chair of General and Analytical Chemistry, Prof. Dr. Wolfhard Wegscheider, for his ongoing and strong support of the corrosion group.

In 2013 a new Austrian corrosion course was established in Leoben together with industry and is planned to be upgraded to a full postgraduate university course in the future.

Activities of the Leoben corrosion group have won the bid for organizing the Eurocorr 2015, the European corrosion conference with 700–1000 participants, to be held in Graz under the guidance of ASMET in September 2015. The motto of this conference is a simple fundamental truth in corrosion science:

Earth, water, fire, air,
 corrosion happens everywhere.

(Heimo Jäger)

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