DECHEMA

PROGRAMME

28.—30. October 2015

DECHEMA-Haus • Frankfurt am Main

European Federation of Corrosion Workshop

Insight, Mechanisms and Modelling in High Temperature Corrosion

www.dechema.de/efcws2015

DECHEMA
FORSCHUNGSINSTITUT
Stiftung bürgerlichen Rechts

GfKORR

EFC

EFC-Event No. 393

Invitation

Research on high temperature corrosion has been performed since about 100 years and a significant level of understanding has been achieved. Nevertheless, there are still a number of open questions and in particular the step from understanding the corrosion mechanisms to mak-ing quantitative use of this knowledge for predicting materials behavior still seems to offer a wide potential for further development. Furthermore, there is increasing demand from industry for the development of efficient modelling tools in high temperature corrosion to allow for the assessment of expected materials or components behavior, thus avoiding extensive testing ef-forts. Such tools ideally predict the metal damage rates under operating conditions but can also be of significant importance if they describe the role of the various environmental, operational and materials parameters with regard to their impact on corrosion rates in a quantitative manner. There have already been extensive efforts in this respect in the past but most recently the impetus from industry has increased in particular for combining already existing singular model approaches in order to establish comprehensive and efficient software tools describing the in-dustrial situation as a holistic approach.

The aim of the workshop is to identify the recent developments contributing to an improved

understanding of high temperature corrosion processes, in particular with regard to a quantitative description of the corrosion mechanisms, and to examine its potential for the development of models to be used in actual component design. The modelling approaches may address thermodynamic and kinetic features, microstructural and alloying effects, environmental or op-erational conditions, protective coatings and surface modifications, etc. In particular, models need to be validated to ensure their reliable use in practical applications, i.e. the workshop will also emphasize aspects of model validation.

The workshop follows the tradition of former workshops where a specific focus topic was select-ed for discussion, bringing together the experts and all those interested in this topic for an in-depth discussion of all relevant aspects.

We would like to cordially invite you to participate in this workshop with or without an original contribution, extending your knowledge in this area of materials science. In this way we expect another stimulating workshop in this EFC-series of events.

Michael Schütze
DECHEMA-Forschungsinstitut
Frankfurt am Main

Willem J. Quadakkers
Forschungszentrum Jülich
Jülich

Call for Posters

Authors still wishing to present their scientific and technical results in the form of a poster are asked to submit a one-page abstract by 02 October 2015 via file upload at

www.dechema.de/efcws2015

The abstract should not exceed one page (max. size 500 kb incl. figures) and should include the title, authors and their affiliation. A template is available on the website.

The congress language is English.

Registration

Registration can be made online, for more details please visit
www.dechema.de/efcws2015

Registration fee* **520 Euro**

*All prices are VAT-free acc. to § 4.22. UStG
The conference ticket includes the book of abstracts, list of participants, meals and beverages during the breaks and conference dinner.

Publication

It is planned to publish refereed contributions after the Workshop in a special issue of the journal “Materials and Corrosion”. Authors who wish to submit their contributions for publication will be requested to deliver their manuscripts by the time of the Workshop. Details concerning the submission will be provided in the subsequent announcement.

Organiser and Contact

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Programme

EFC Workshop: Insight, mechanisms and modelling in high temperature corrosion

Wednesday, 28.10.2015

08:30 – 09:30 *Registration*

09:30 – 09:40 *Welcome (M. Schütze, DECHEMA)*

Gas phase corrosion by oxygen
Chair:

09:40 – 10:10 **Promoting alumina formation on nickel-base alloy 602 CA by pre-oxidation at lower temperatures**
A. Chyrkin[1]; R. Pillai[1]; T. Galiullin[1]; M. Schiek[1]; L. Niewolak[1]; D. Grüner[1]; W. Quadakkers[1]
[1] Forschungszentrum Jülich GmbH, Jülich/DE

10:10 – 10:40 **Modelling of water side performance of high temperature materials for efficient power plant**
S. Yli-Olli[1]; S. Tuurna[2]; P. Auerkari[1]
[1] VTT Technical research centre of Finland Ltd, Espoo/FI; [2] VTT Technical research centre of Finland Ltd, Tampere/FI

10:40 – 11:10 **Effect of surface pre-treatment on microstructure changes and oxidation resistance of aluminized Ni-based single crystal superalloys**
H. Murakami[1]
[1] National Institute for Materials Science, Tsukuba-Science-City/JP

11:10 – 11:30 Coffee Break

Gas phase corrosion by oxygen
Chair:

11:30 – 12:00 **Thermodynamic and kinetic aspects on the short term oxidation of Fe-Mn-Si alloys between 900 and 1600 °C**
M. Spiegel[1]
[1] Salzgitter Mannesmann Forschung GmbH, Duisburg/DE

12:00 – 12:30 **Effect of Cu on high-temperature oxidation of alumina forming austenitic Fe-Ni-Cr-Al-Cu alloys**
S. Hayashi[1]; D. Kudo[2]; S. Ukai[2]
[1] Tokyo Institute of Technology, Tokyo/JP; [2] Hokkaido University, Sapporo/JP

12:30 - 13:10 **Computation-based prediction of Ni-base alloy oxidation behavior**
B. Gleeson[1]; W. Zhao[1]
[1] University of Pittsburgh, Pittsburgh/US

Wednesday, 28.10.2015

13:10 – 14:00 Lunch Break

14:00 – 15:00 *Poster Session*

Gas phase corrosion by oxygen
Chair:

15:00 – 15:30 **Internal oxidation of high strength steels during short-term annealing: Observation of unexpectedly fast progress of the internal oxidation and first tentative model**
A. Wengert[1]; A. Vogel[1]; M. Rohwerder[1]
[1] MPI für Eisenforschung GmbH, Düsseldorf/DE

15:30 – 16:00 **Oxidation of iron: experiments and simulations**
H. Larsson[1]; T. Jonsson[2]; Y. Gong[3]; R. Reed[3]; J. Agren[1]
[1] Royal Institute of Technology, Stockholm/SE; [2] Chalmers University of Technology, Göteborg/SE; [3] University of Oxford, Oxford/GB

16:00 – 16:30 **The photoelectrochemical techniques: an efficient tool to characterize thermal oxide scales**
Y. Wouters[1]; J. Petit[1]; M. Mermoux[1]; M. Skocic[1]; A. Srisrual[2]; Y. Madi[3]; L. Latu-Romain[1]; D. Kaczorowski[4]; C. Pascal[5]; V. Parry[5]
[1] University of Grenoble, Saint Martin d'Hères/FR; [2] King Mongkut's University of Technology North Bangkok, Bangkok/TH; [3] University of Science and Technology Houari Boumediene, Alger/DZ; [4] Areva NP, Lyon/FR; [5] University of Grenoble, Grenoble/FR

16:30 – 17:00 *Coffee Break*

17:00 – 17:30 **Mechanistic studies of scale formation in the ternary Co-Al-W system at temperatures between 800 and 900°C**
M. Weiser[1]; S. Virtanen[1]
[1] Friedrich-Alexander Universität Erlangen-Nürnberg, Erlangen/DE

17:30 – 18:00 **Oxide phases and residual stresses in scales formed at early oxidation stages on β-NiAl at 1473 K and the effect of implanted yttrium**
J. Jedlinski[1]
[1] AGH University of Science and Technology, Kraków/PL

18:00 – 19:00 *Poster Session*

19:00 – 22:00 *Dinner Buffet*

Thursday, 29.10.2015

Gas phase corrosion by mixed oxidants
Chair:

09:30 – 10:00 **Modelling internal oxidation and nitridation in an alumina-forming austenitic stainless steel**
R. Elger[1]; H. Magnusson[2]; K. Frisk[2]
[1] Swerea KIMAB AB, Kista/SE; [2] Swerea KIMAB AB, Stockholm/SE

10:00 – 10:30 **Modelling the effect of gas flow rate on oxidation limited life time of NiCr-base alloys**
P. Huczkowski[1]; E. Hejrani[1]; W. Lehnert[1]; A. Chyrkin[1]; R. Pillai[1]; D. Grüner[1]; W. Nowak[1]; W. Quadakkers[1]
[1] Forschungszentrum Jülich GmbH, Jülich/DE

10:30 – 11:00 **Prediction of high temperature corrosion phenomena by the cellular automata approach: challenges, modeling concept and application**
K. Jahns[1]; K. Balinski[1]; M. Landwehr[1]; J. Wübbelmann[1]; U. Krupp[1]
[1] University of Applied Sciences Osnabrück, Osnabrück/DE

11:00 – 11:30 *Coffee Break*

11:30 – 12:00 **Modelling gas turbine materials' hot corrosion degradation in combustion environments from H_2-rich syngas**
J. Sumner[1]; A. Potter[1]; N. Simms[1]; J. Oakey[1]
[1] Cranfield University, Cranfield, Bedfordshire/GB

12:00 – 12:30 **Oxygen permeability determination for Fe-Ni alloys at high temperatures under carbon-containing gases**
D. Jullian[1]; A. Prillieux[2]; J. Zhang[1]; D. Young[3]
[1] University of New South Wales, Kensington/AU; [2] School of Materials Science and Engineering, UNSW, Sydney/AU; [3] University of New South Wales, Sydney/AU

12:30 – 13:10 **Effect of pressure on supercritical CO_2 compatibility of structural alloys at 750°C**
B. Pint[1]; R. Brese[1]; J. Keiser[1]
[1] Oak Ridge National Laboratory, Oak Ridge, TN/US

13:10 – 14:00 *Lunch Break*

Gas phase corrosion by mixed oxidants
Chair:

14:00 – 14:40 **Transport of secondary oxidants through otherwise protective oxide scales**
D. Young[1]
[1] University of New South Wales, Sydney/AU

Thursday, 29.10.2015

14:40 – 15:10 **Influence of total pressure and gas velocity at close carbon and close oxygen activities on metal dusting pitting of Cr_2O_3-forming alloys**
A. Fabas[1]; A. Rouaix Van de Put[1]; S. Doublet[2]; D. Monceau[3]
[1] Institut Carnot CIRIMAT, Toulouse/FR; [2] Air Liquide R&D, Jouy-en-Josas/FR; [3] Université de Toulouse, Toulouse/FR

15:10 – 15:40 **Lifetime modeling of Fe-Ni-Cr alloys under high temperature corrosion and metal dusting degradation**
S. Camperos[1]; D. Monceau[2]; A. Fabas[3]; A. Rouaix Van de Put[3]; P. Floquet[4]; J. Brossard[5]; E. Schaal[6]; S. Doublet[7]
[1] Cirimat, Toulouse/FR; [2] Université de Toulouse, Toulouse/FR; [3] Institut Carnot CIRIMAT, Toulouse/FR; [4] LGC, Toulouse/FR; [5] Veolia Environnement, Limay/FR; [6] Institut Jean LAMOUR, Vandoeuvre-lès-Nancy/FR; [7] Air Liquide R&D, Jouy-en-Josas/FR

15:40 – 16:00 *Coffee Break*

Deposits corrosion
Chair:

16:00 – 16:30 **Corrosion behaviour of FeCrAl alloys in a used-wood firing plant**
Y. Alipour[1]; P. Henderson[2]; P. Szakalos[1]
[1] KTH Royal Institute of Technology, Stockholm/SE; [2] Vattenfall AB, Stockholm/SE

16:30 – 17:00 **High temperature corrosion of alloys and coatings in laboratory simulated biomass combustion superheater environments**
A. Pidcock[1]; N. Simms[2]; J. Nicholls[1]; J. Oakey[1]
[1] Cranfield University, Cranfield/GB; [2] Cranfield University, Cranfield, Bedfordshire/GB

17:00 – 17:30 **The mechanisms behind the long-term behaviour in the presence of KCl(s) on a low alloyed steel at 400°C and 500 °C**
M. Olivas Ogaz[1]; J. Liske[1]; J. Svensson[1]; T. Jonsson[1]
[1] Chalmers University of Technology, Göteborg/SE

17:30 – 18:00 **Erosion/corrosion resistance of re-melted self-fluxing alloy coatings in biomass and waste fired boilers**
Y. Kawahara[1]
[1] Dai-Ichi High Frequency Co.,Ltd., Chuo-ku, Tokyo,/JP

18:00 – 19:00 *Poster Session*

19:00 – 22:00 *Dinner Buffet*

Friday, 30.10.2015

Stresses in high temperature corrosion
Chair:

08:30 – 09:10 **Stress evolution in surface oxides during thermal cycling: testing a creep hysteresis model for an alumina-forming alloy**
P. Tortorelli[1]; E. Specht[1]; H. Evans[2]
[1] Oak Ridge National Laboratory, Oak Ridge/US; [2] The University of Birmingham, Birmingham/GB

09:10 – 09:40 **Modeling the mechanical stability of oxide scales**
M. Rudolphi[1]; M. Schütze[1]
[1] DECHEMA-Forschungsinstitut, Frankfurt am Main/DE

09:40 – 10:10 **Determination of oxidation lifetime for diffusion NiAl coatings using a mechanical model approach**
C. Oskay[1]; M. Galetz[1]; M. Rudolphi[1]; M. Schütze[1]
[1] DECHEMA-Forschungsinstitut, Frankfurt am Main/DE

10:10 – 10:40 **Influence of stress level on the corrosion rate of a carbon steel in solar molten salts mixtures at high temperature**
O. Conejero[1]; E. Mielgo[2]; L. Millan[3]
[1] ITMA Materials Technology, Avilés/ES; [2] ITMA Materials Technology, Aviles/ES; [3] TSK Electronica y Electricidad, S.A., Gijon/ES

10:40 – 11:00 *Coffee Break*

Coatings
Chair:

11:00 – 11:30 **Correlations between experimental and modeling of diffusion in aluminized pure Ni and IN800HT substrates. Impact of measurement errors on the accuracy of results.**
F. Pedraza[1]; M. Proy[1]; P. Krukovskyi[2]; M. Metel[2]
[1] Université de La Rochelle, La Rochelle/FR; [2] Institute of Engineering Thermophysics, Kiev/UA

11:30 – 12:00 **Diffusion and lifetime modeling for slurry aluminide coating on P92 substrate at 650º C with a computation-experimental approach**
P. Krukovskyi[1]; M. Metel[2]; A. Agüero[3]; R. Muelas[3]; V. Kolarik[4]
[1] Institute of Engineering Thermophysics, Kiev/UA; [2] Institute of engineering thermophysics, Kiev/UA; [3] Instituto Nacional de Técnica Aeroespacial, Madrid/ES; [4] Fraunhofer ICT, Pfinztal/DE

12:00 – 12:30 **Modelling of the interdiffusion and oxidation of a multilayered chromia forming thermal barrier coating**
M. Taylor[1]; P. Smith[2]; H. Evans[1]
[1] The University of Birmingham, Birmingham/GB; [2] Rolls Royce, Derby/GB

Friday, 30.10.2015

12:30 – 13:00 **Validation of hot corrosion risk model for gas turbine blading by ex-service components with thermal barrier coatings**
B. Bordenet[1]; W. König[1]; K. Stefansson[1]
[1] Alstom (Switzerland) Ltd., Baden/CH

13:00 – 13:15 *Poster award presentation and closing of the workshop (W.Quadakkers, FZ Jülich)*

13:15 – 14:00 *Lunch*

Poster programme

A ***Gas phase corrosion by oxygen***

1 **Improved understanding of the kinetics and elementary mechanisms in corrosion processes due to the jumps method**
M. Pijolat[1]; V. Peres[2]
[1] , Saint-Etienne/FR; [2] Ecole des Mines de Saint-Etienne, Saint-Etienne/FR

2 **Microstructure evolution related to the breakaway oxidation of AISI 304L at 850 °C in dry oxygen**
A. Col[1]; C. Pascal[2]; V. Parry[2]; Y. Wouters[3]
[1] SIMAP, Saint Martin d'Hères/FR; [2] University of Grenoble, Grenoble/FR; [3] University of Grenoble, Saint Martin d'Hères/FR

3 **Combined effect of Cr and Al on the Initial Al_2O_3 scale formation on Fe-Cr-Al alloys**
S. Yoneda[1]; S. Hayashi[1]; I. Saeki[2]; M. Takeyama[1]; S. Ukai[3]
[1] Tokyo Institute of Technology, Meguro-ku/JP; [2] Murrain Institute of Technology, Muroran/JP; [3] Hokkaido University, Sapporo/JP

4 **Effect of alloy composition on the oxidation induced boron depletion in cast Ni-base superalloy components**
D. Naumenko[1]; A. Jalowicka[1]; W. Nowak[1]; D. Young[2]; V. Nischwitz[1]; D. Grüner[1]; W. Quadakkers[1]
[1] Forschungszentrum Jülich GmbH, Jülich/DE; [2] University of New South Wales, Sydney/AU

5 **The oxidation behaviour of the pulse plasma sintered β-NiAl intermetallic compound at 1150^0C**
J. Jedlinski[1]
[1] AGH University of Science and Technology, Kraków/PL

6 **Decreased sublimation kinetic of chromium oxide in O_2-H_2O atmosphere by preoxidation method**
W. Wongpromrat[1]; V. Parry[2]; G. Berthome[1]; C. Pascal[1]; S. Chandra-ambhorn[3]; W. Chandra-ambhorn[4]; Y. Wouters[1]
[1] University of Grenoble, Saint Martin d'Hères/FR; [2] University of Grenoble, Grenoble/FR; [3] King Mongkut's University of Technology North Bangkok, Bangkok/TH; [4] King Mongkut's Institute of Technology Ladkrabang, Bangkok/TH

B ***Gas phase corrosion by mixed oxidants***

1 **Methods for generating and assessing high temperature corrosion damage**
A. Encinas-Oropesa[1]; N. Simms[1]; J. Sumner[2]; A. Pidcock[1]; J. Nicholls[1]
[1] Cranfield University, Cranfield/GB; [2] Cranfield University, Cranfield, Bedfordshire/GB

C ***Deposits corrosion***

1 **Corrosion resistance of stainless steels in solar molten salts at high constant and cyclic temperature**
E. Mielgo[1]; O. Conejero[1]; E. Lago[2]
[1] ITMA Materials Technology, Avilés/ES; [2] TSK Electronica y Electricidad, S.A., Gijon/ES

2 **Improving risk based inspection to prevent sulfidation failures**
M. Elsamani[1]; S. Etubus[2]; M. Mohammed[3]; A. Barnett[2]; K. Raheem[2]
[1] Wood Group Kenny, STAINES/GB; [2] WoodGroup Kenny, Staines/GB; [3] Wood Group Kenny, Stanwell/GB

3 **Investigation of corrosion behaviour of different steels in hot molten salt for solar thermal power plants**
D. Rückle[1]; S. Kaesche[1]; N. Pfleger[2]; N. Breidenbach[2]; S. Virtanen[3]; H. Garrecht[1]
[1] Universität Stuttgart, Stuttgart/DE; [2] DLR - German Aerospace Center, Stuttgart/DE; [3] Friedrich-Alexander Universität Erlangen-Nürnberg, Erlangen/DE

4 **Study of corrosion kinetics and mechanisms of metallic materials in waste to energy conditions**
E. Schaal[1]
[1] Institut Jean LAMOUR, Vandoeuvre-lès-Nancy/FR

5 **Effective parameters on near surface corrosion of waste incineration super heater tubes**
L. Konrad[1]
[1] DFI, Frankfurt am Main/DE

D ***Stresses in high temperature corrosion***

1 **A system for corrosion fatigue tests of metallic materials under high pressure and high temperature**
M. Wolf[1]; A. Pfennig[2]; T. Böllinghaus[1]
[1] Federal Institute for Materials Research and Testing, Berlin/DE; [2] HTW University of Applied Sciences Berlin, Berlin/DE

2 **High temperature cyclic oxidation of austenitic stainless steels in relation with the oxide scale damaging behaviour during tensile test**
E. Fedorova[1]; D. Monceau[2]; M. Braccini[3]; C. Pascal[4]; V. Parry[4]; D. Oquab[2]; N. Nikolaeva[5]; Y. Wouters[6]; M. Mantel[7]
[1] Polytechnic Institute of Siberian Federal University, Krasnoyarsk/RU; [2] Université de Toulouse, Toulouse/FR; [3] Université Grenoble Alpes, Grenoble/FR; [4] University of Grenoble, Grenoble/FR; [5] Siberian Federal University, Krasnoyarsk/RU; [6] University of Grenoble, Saint Martin d'Hères/FR; [7] Ugitech SA, Ugine/FR

3 **The residual stresses in α-Al_2O_3 scales developing on β-NiAl: The effect of Hf-additions and production route**
J. Jedlinski[1]
[1] AGH University of Science and Technology, Kraków/PL

4 **Numerical and experimental studies of traction induced multiple cracking on thermally grown oxide scale**
V. Parry[1]; C. Pascal[2]; M. Braccini[2]; Y. Wouters[2]; E. Fedorova[3]; M. Mantel[2]; G. Parry[2]
[1] University of Grenoble, Grenoble/FR; [2] University of Grenoble, Saint Martin d'Hères/FR; [3] Polytechnic Institute of Siberian Federal University, Krasnoyarsk/RU

E ***Coatings***

1 **Innovations in protective coatings**
C. Bateman[1]; M. Silva[2]
[1] Belzona Polymerics Ltd, Harrogate/GB; [2] Belzona Polymerics, Harrogate/GB

2 **Steam oxidation of alloys and coatings in simulated advanced superheater / reheater conditions**
N. Simms[1]; A. Pidcock[1]; J. Oakey[2]
[1] Cranfield University, Cranfield, Bedfordshire/GB; [2] Cranfield University, Cranfield/GB

3 **Investigations on environmentally friendly slurry coatings formed by onsite heating methods**
A. Naji[1]
[1] DECHEMA-Forschungsinstitut, Frankfurt am Main/DE

4 **Modelling aluminide coating on Ni-base alloy 602 CA: - As coated microstructure and degradation during exposure -**
R. Pillai[1]; A. Chyrkin[1]; W. Quadakkers[1]
[1] Forschungszentrum Jülich GmbH, Jülich/DE

5 **Modified surfaces for application in incineration plants**
A. Förg[1]; P. Masset[1]; A. Soleimani Dorcheh[2]; M. Schütze[2]; S. Peeterbroeck[3]; M. Poelman[3]
[1] Fraunhofer Institute UMSICHT, Sulzbach-Rosenberg/DE; [2] DECHEMA-Forschungsinstitut, Frankfurt am Main/DE; [3] Materia Nova, Mons/BE

6 **Surface chemistry evolution of F-doped Ni-base superalloy during heating**
H. Zschau[1]; M. Schütze[1]; M. Galetz[1]; B. Gleeson[3]; S. Neve[4]; M. Lorenz[5]; M. Grundmann[5]
[1] DECHEMA-Forschungsinstitut, Frankfurt am Main/DE; [3] University of Pittsburgh, Pittsburgh/US; [4] Goethe-Universität Frankfurt am Main, Frankfurt/DE; [5] Universität Leipzig, Institut für Experimentelle Physik, Leipzig/DE

7 **γ-TiAl-recycling increases inherent oxidation protection**
H. Zschau[1]; M. Schütze[1]; M. Galetz[1]; P. Spiess[3]; B. Friedrich[4]; A. Straubel[5]; C. Leyens[6]
[1] DECHEMA-Forschungsinstitut, Frankfurt am Main/DE; [3] RWTH Aachen University, Aachen/DE; [4] RWTH Aachen University, IME Metallurgische Prozesstechnik und Metallrecycling, Aachen/DE; [5] TU Dresden, Dresden/DE; [6] TU Dresden, Institut für Werkstoffwissenschaft, Dresden/DE

8 **Application and characterization of a duplex platinum aluminide/APS-TBC coating system**
S. Mastali[1]; H. Abdollahpour[2]; A. Rashidghamat[3]; K. Shirvani[4]
[1] MAPNA Blade Engineering and Manufacturing Company-Parto, Tehran/IR; [2] Semnan University, Semnan/IR; [3] Iranian Research Organization for Science and Technology (IROST), Tehran/IR; [4] IROST, Tehran/IR

9 **Behavior of La-Sr-Mn coatings for SOEC interconnector materials in pure steam under high pressure and high temperature**
M. Juez-Lorenzo[1]; V. Kolarik[2]; V. Kuchenreuther[1]; D. Schimanke[3]
[1] Fraunhofer Institut für Chemische Technologie ICT, Pfinztal/DE; [2] Fraunhofer ICT, Pfinztal/DE; [3] sunfire GmbH, Dresden/DE

F ***Miscellaneous***

1 **Wear behaviour and corrosion resistance of nano Si C-C composite in lubrication**

A. Omar[1]; N. Al mehbad[2]
[1] egyptian petroleum institute EPRI, Nasr City/EG; [2] , Najran/SA

2 **Electrochemical corrosion performance of mechanically polished Alloy 690TT at high–temperature water (200 °C)**

F. Arjmand[1]
[1] Shanghai Jiao Tong University, Shanghai/CN

3 **Corrosion prediction modelling for high temperature subsea production streams: a conundrum for design engineers, a perspective from WGK projects**

M. Mohammed[1]
[1] Wood Group Kenny, Stanwell/GB

4 **High-temperature corrosion of autoclave material under ammonothermal conditions**

B. Hertweck[1]; A. Kimmel[1]; T. Steigerwald[1]; N. Alt[1]; E. Schlücker[1]
[1] Universität Erlangen-Nürnberg, Erlangen/DE