



# CONTENTS

viii

*FOREWORD* by J R Blank, Chairman of  
Conference Organizing Committee

## SESSION I PROCESSING

---

2  
*Influence of steelmaking and primary  
processing factors on availability and  
properties of stainless steels*

H Everson and M A Clarke

13  
*Application of 'Horicast' for  
continuous casting of stainless and  
high alloy steels*

D A Preshaw

21  
*Hot extrusion of special sections  
in stainless steel*

J Middleton

34  
*Duplex stainless steels produced by  
hot isostatic pressing: opportunity to  
improve materials and develop  
new materials*

M Lindenmo

42  
*In-line heat treatment of austenitic  
and ferritic stainless steel wire*

G Baralis, M Farinet and  
F Guglielmi

## SESSION II FABRICATION

---

53  
*Progress in welding stainless steels*

T G Gooch

62  
*Variable penetration in automatic  
TIG welding of Type 304L austenitic  
stainless steel*

D T Llewellyn, E N Bower and  
T Gladman

74  
*Effect of shielding gas on  
variable weld penetration*

J I Leinonen

79  
*Influence of composition and  
microstructure on properties of a  
fully austenitic weld metal*

S L Andersson and L Karlsson

87  
*Duplex stainless steel  
welding and applications*

J Hilkes and K Bekkers

96  
*Effect of heat input on duplex  
stainless steel submerged arc welds*

M Niset, R Doyen and A Van Bemst

105  
*Influence of welding process on  
mechanical properties of duplex  
stainless steel weld metals*

B Grefot, S Rigdal,  
L Karlsson and L-E Svensson

113  
*Phase transformation in duplex  
20Cr—9Ni—3Mo stainless steel welds  
aged at 1050°C*

T A Towers and G A Honeyman

123  
*Improving properties of weld joints  
in duplex stainless steel by welding  
with shielding gas containing nitrogen*

K-J Blom

### SESSION III CORROSION

---

127  
*Metallurgical control of localized  
corrosion of stainless steels*

A J Sedriks

138  
*Metallurgical aspects of  
corrosion resistance of  
stabilized 17%Cr stainless steels*

B Baroux, P Pédarrie and J Decroix

144  
*Development of oxidation-resistant  
Si-bearing ferritic stainless steels*

S Akiyama and H Fujikawa

151  
*Microstructural stability and  
corrosion resistance of 29Cr—4Mo—Ti  
superferritic stainless steel*

J C Bavay, J M Boulet,  
P Bourgain and P Chemelle

160  
*Processing and localized corrosion  
properties of 25—29Cr superferritic  
stainless steels*

F Mancina, M Barteri, L Sassetti,  
A Tamba and A Lannaioli

168  
*Stress corrosion cracking and  
hydrogen embrittlement behavior of 25%Cr  
duplex stainless steel in  
H<sub>2</sub>S-bearing environment*

T Kudo, H Tsuge and A Seki

176  
*Selective corrosion of  
duplex stainless steels*

E Symnietis-Barrdahl

186  
*Influence of flow rate on corrosion  
behaviour of stainless steel*

S Lagerberg

192  
*Effects of chlorine on corrosion of  
high alloy stainless steel in seawater*

R Francis

### SESSION IV CORROSION

---

201  
*In-situ ellipsometric determination of  
thickness and optical constants of passive  
films on austenitic stainless steels*

K Sugimoto and S Matsuda

207  
*ESCA characterization of passive  
films on stainless steels*

S Jin and A Atrens

215  
*Atmospheric corrosion resistance  
of stainless steels*

N G Needham, P F Freeman,  
J Wilkinson and J Chapman

224  
*Low-molybdenum austenitic  
stainless steel: improved pitting  
corrosion resistance*

Y Fujiwara, R Nemoto and K Osozawa

234  
*Effects of residual element contents  
on corrosion resistance of Type 304L  
stainless steels in boiling nitric acid*

F R Beckitt, B Bastow and T Gladman

247  
*High nitrogen stainless steels:  
austenitic, duplex and martensitic*

M O Speidel

253  
*Effect of chlorination on corrosion characteristics of stainless steels used in offshore seawater handling systems*

R E Malpas, P Gallagher and  
E B Shone

259  
*Superaustenitic stainless steels for marine applications*

J Charles, P Soullignac,  
J P Audouard and D Catelin

266  
*Effect of nitrogen alloying on sensitisation behaviour of two highly-alloyed austenitic stainless steels*

R F A Jargelius

273  
*Stress corrosion cracking of steel components used in directional drilling of oil and gas wells*

J E Truman and K B Lomax

## SESSION V MECHANICAL PROPERTIES

---

284  
*Influence of silicon and nitrogen on properties of some austenitic steels*

P Gumpel

291  
*Nitrogen strengthening of duplex stainless steels*

G Wahlberg and G L Dunlop

300  
*Development of corrosion-abrasion resistant steels for South African gold mining industry*

B Metcalfe, W. M. Whitaker and  
U R Lenel

307  
*Application of stainless steels for improved wear resistance and flow characteristics in bulk solids storage and handling plant*

W T Cook, J Peace and J R Fletcher

317  
*Application of as-quenched low-carbon martensitic stainless steels to wear-resisting use*

K Yoshioka, K Miura and S Suzuki

325  
*Developments in use of stainless steels for offshore pipework systems*

C V Roscoe, K J Gradwell,  
M Watts and W J Nisbet

334  
*Anisotropy of elastic and plastic properties of 17Cr—8Ni—2Mo and 19Cr—12Ni—3Mo weld metals*

S T Kimmins and C A P Horton

345  
*Physical metallurgy of 'Fecralloy' steels*

S R Keown

357  
*Near-threshold fatigue growth in a microduplex stainless steel*

J Wasén, E U Engström and  
B Karlsson

363  
*Influence of cathodic hydrogen on microstructure of duplex stainless steels*

L J R Cohen, J A Charles and  
G C Smith

## SESSION VI ELEVATED TEMPERATURE EFFECTS

---

376  
*High temperature aspects of stainless steels*

T Gladman

386  
*Formation of deformation band and recrystallization behaviour of fully ferritic stainless steels under hot rolling process*

Y Uematsu and K Yamazaki

394

*Effects of strain-rate history on strain-ageing phenomena in AISI 316 stainless steel*

A M Eleiche, C Albertini and M Montagnani

405

*Creep properties of duplex 316 weld metals: role of residuals*

J J Smith, R A Farrar and J Myers

415

*Transformation characteristics and microstructure of 12%CrMoV weld metal*

C S Wright and T N Baker

## POSTERS

---

422

*Duplex stainless steel as modern material: corrosion resistance of base metal and welded joints*

J M Lardon, J Charles, F Dupouiron, P Pugeault and D Catelin

432

*Role of secondary phase precipitation in intergranular corrosion of differently stabilized ELI ferritic stainless steels*

M Barteri, S Fortunati, L Sassetti, L Scoppio and A Tamba

443

*Post-fabrication painting systems for stainless steels and their performance in marine atmospheres*

K Johnson and P G Stone

454

*Formation of intermetallic phases and their influence on mechanical properties and corrosion behaviour in 25Cr—4Mo—4Ni—Ti ferritic stainless steel ('MONIT')*

H L Cao, S Hertzman and W B Hutchinson

462

*Machinability of stainless steels with controlled oxide inclusions*

O Bletton, R Duet, B Heritier and P Pedarre

466

*Effects of ageing on creep behaviour of two Type 347 stainless steel castings*

J C Lawrenson, R Pilkington and D A Miller

474

*Mechanical behaviour of a 29Cr—4Mo—2Ni superferritic stainless steel*

M Anglada, M Nasarre and J A Planell

481

*Structure stability of two highly-alloyed nickel-base alloys*

A M Wardle and H Eriksson

490

*Superplasticity of a duplex stainless steel*

K Osada, S Uekoh and K Ebato

498

*Strain rate and temperature dependence of hot strength in 301, 304, 316 and 317 steels in as-cast and worked conditions*

N D Ryan and H J McQueen

508

*Rapid electrolytic descaling process for stainless steel wire rods*

R H G Rau

512

*Review of physical metallurgy, properties and applications of dual-phase ferritic—martensitic steel designated '3CR12'*

R D Knutsen, A Ball, J Hewitt, J P Hoffman and R Hutchings

521

*Production of cold-rolled stainless steel sheets for tower internals of heavy water plants*

V P Sardana and B B Patnaik

531

*Improved technique for control of NO<sub>x</sub> gas emissions from pickling of stainless steel*

I Dalin, P Andréasson and T Berglind

535

*Substitute nickel-free chromium, manganese, nitrogen austenitic stainless steels*

B R Nijhawan

541

*Effect of austenitizing and tempering conditions on structure and mechanical properties of 9Cr—1Mo martensitic alloy*

A Alamo, J L Boutard, M Pigoury, C Lelong and C Foucher

547

*Elevated temperature tensile properties of a duplex low-carbon 12%Cr steel*

G Leadbeater, C F Fletcher and J H Dalton

554

*Phase differentiation in duplex stainless steel by potentiostatic etching*

J H Dalton, M Smith and P E de Visser

561

**AUTHOR INDEX**

562

**SUBJECT INDEX**