

**Aluminium Alloys**  
**Their Physical and Mechanical Properties**  
**Part 4/Supplement**

**Proceedings of the 5th International Conference ICAA5,  
held in Grenoble, France, July 1-5, 1996**

*Editors:*

**J.H. Driver, B. Dubost, F. Durand, R. Fougères,  
P. Guyot, P. Sainfort and M. Suery**

Société Française de Métallurgie et de Matériaux  
Institut National Polytechnique de Grenoble

**TRANS TECH PUBLICATIONS**  
**Switzerland • Germany • UK • USA**

# Table of Contents

## PART 4/SUPPLEMENT

<b>Committees and Acknowledgements</b>	v
<b>Postface</b>	vi

### Invited Lectures

<b>Prospects for the Aluminium Industry</b>	
B. Legrand	3
<b>Aluminium Structures Used in Aerospace – Status and Prospects</b>	
K.-H. Rendigs	11
<b>Structure and Property Control of Aerospace Alloys</b>	
P. Sainfort, C. Sigli, G.M. Raynaud and Ph. Gomiero	25
<b>Aluminium Alloys for Automotive Application</b>	
J. Hirsch	33
<b>Alternative Materials for a New Generation of Vehicles</b>	
N.A. Gjostein	51

### Casting and Solidification Processing

<b>Effect of Cavitation Melt Treatment on the Structure Refinement and Property Improvement in Cast and Deformed Hypereutectic Al-Si Alloys</b>	
G.I. Eskin, Yu.P. Pimenov and G.S. Makarov	65
<b>Rapidly Solidified Layers on an <math>AlZn_5Mg_3Cu_{0.8}</math> Alloy</b>	
J. Lašek, P. Bartuška and B. Major	71
<b>Control of Segregation in Squeeze Cast Al-4.5Cu Binary Alloy</b>	
G. Durrant, M. Gallerneault and B. Cantor	77
<b>Numerical Method for Analysis of Microporosity Formation in Aluminium Alloy Castings</b>	
M.L.N.M. Melo, E.M.S. Rizzo and R.G. Santos	83

### Processing of Ingots, Billets and Strips

<b>Indirect Extrusion of Different Al-Si-Powder Alloys</b>	
K. Müller and T. Teubert	91

## Recovery, Recrystallization and Textures

### The Influence of Particle Dispersions and Processing Route in the Development of Recrystallization Textures in Aluminum Alloys

G. Burger, P. Wycliffe, C. Gabryel and D.J. Lloyd 101

### Analysis of Flow Behaviour and Texture Evolution of a Particle Hardened Aluminium Alloy in Plane Strain Deformation

G. Bermig, A. Bartels, H. Mecking, A. Oscarsson and B. Hutchinson 111

## Alloy Constitution, Phase Transformations

### Interaction between Iron and Cooling Rate from the Melt on the Dispersoid Distribution in AA 6013

A. Conte and T.H. Sanders Jr. 119

## Plasticity and Strengthening

### Advanced Properties of Ultra Fine-Grained Al-Alloys

N.K. Tsenev, R.Z. Valiev and I.R. Kuzeev 127

### Comparison of Anisotropy and Flow Behaviour in Two AlZnMg Extrusions - Recrystallized Versus Nonrecrystallized

A. Fjeldly and H.J. Roven 135

### Changes of Flow Stress by Plane Strain Compression of Al-Si-Cu Alloys at High Temperature

H. Takeuchi, T. Doko, T. Kumazawa and A. Kikuchi 141

### Measurements and Evaluation of Strain Rate Sensitivity in Al at Late Stages of Deformation

P. Les, M. Zehetbauer and H.P. Stüwe 147

### Tensile Properties at Low to High Strain Rates of AlMgSi and AlZnMg Alloys

B. Andersson and S.R. Skjervold 153

### Mg Effects on the Eutectic Structure and Tensile Properties of Al-Si-Mg Alloys

Q.G. Wang and C.H. Cáceres 159

### Precipitation Hardening Behavior of SiC Whisker Reinforced Al-Cu Based Alloys Composites

S.K. Hong, S. H. Hwang, J.C. Choe, I.M. Park, H. Tezuka, T. Sato and A. Kamino 165

## **Fatigue, Creep and Fracture**

- The Effects of Mixed Mode Loading on Intergranular Failure in AA7050-T7651**  
I. Sinclair and P.J. Gregson 175
- A Comparison of the Damage Tolerance of 7010 T7451 and 7050 T7451**  
A.J. Morris, R.F. Robey, P.D. Couch and E. De los Rios 181
- The Effect of Processing on the Fracture Toughness of 8090 T8 Sheet**  
A.J. Morris, S.B. Williams and M.A. Reynolds 187
- Toughness Enhancement Based on Fracture Mechanical Simulation on Al-SiC<sub>w</sub> Composite**  
T. Kobayashi and H. Toda 193
- The Cyclic Deformation Behaviour of Dispersion Strengthened Aluminium Materials at Elevated Temperatures**  
I. Kröpfl and O. Vöhringer 199

## **Corrosion, Surface Properties**

- Theoretical and Experimental Studies of Galvanic Corrosion between Aluminium and Al-4% Cu Alloys**  
Ph. Bucaille, R. Oltra and T. Warner 207
- The Trivalent Chromium Pretreatment Applied to Aluminium 1050**  
F. Delaunois, V. Poulain and J.-P. Petitjean 213
- Microcapsulated Aluminium Powders**  
O.D. Neikov, P.B. Rabin and G.I. Vasiliyeva 219

## **Joining, Properties of Structural Components**

- Solid Phase Welding of Alloy AA6061 and SiC<sub>p</sub> Reinforced Alloy AA6061 at Intermediate Temperature**  
T. Yokota, M. Otsuka, T. Haseyama, T. Ueki and H. Tokisue 225
- Fatigue Properties of Mechanical Fastening Joints**  
H. Mizukoshi and H. Okada 231
- Industrial Applications of Superplastic Forming with Aluminum Alloys**  
E. Gratiot and G. Surdon 239
- Advanced Weldable High-Strength Al-Cu-Li Alloy for Aerospace Applications**  
U. Koch, T. Pfannenmüller, V. Davydov, J.N. Fridlyander and P.-J. Winkler 243

<b>Advanced Weldable Damage Tolerant AlMgLi Alloy for Aircraft Application</b>	
J.N. Fridlyander, N.I. Kolobnev, O.E. Grushko and V.G. Davydov	249
<b>Al-Li Alloys for Lower Wings and Horizontal Stabilizer Applications</b>	
R.J. Rioja, C.J. Warren, M.D. Goodyear, M. Kulak and G.H. Bray	255
<b>Alloy and Product Development</b>	
<b>Weldable High-Strength Aluminium Alloys</b>	
Yu. Zolotarevsky	263
<b>Author Index</b>	267
<b>Keyword Index</b>	269