

Technical Program Information

Oral session - 1

Dec. 5, Monday 09:10 – 10:45, Kyogoku room

Chairperson: Tadashi Furuhashi

09:10 - 09:20

Opening Remark

Yoshihito Kawamura

Kumamoto University, Japan

PLE - 01 09:20 - 10:00

Formation of LPSO phases in Mg alloys – competition with other stable and metastable phases

Rainer Schmid-Fetzer

Clausthal University of Technology, Germany

INV - 01 10:00 - 10:25

Precipitation Mechanism of Mg-Zn-Gd alloys

Takanori Kiguchi¹, Kazuhisa Sato², and Toyohiko J. Konno¹

¹Tohoku University, Japan

²Osaka University, Japan

ORAL - 01 10:25 - 10:45

Monte Carlo study on microstructure evolution in Mg-based binary alloys

Takahiro Yabe, Masanori Enoki and Hiroshi Ohtani

Tohoku University, Japan

Coffee break 10:45 - 11:05

Oral session - 2
Dec. 5, Monday 11:05 – 12:30, Kyogoku room
Chairperson: Kazuya Aizawa

PEL-02 11:05 – 11:45

Modeling the deformation of LPSO-containing $Mg_{97}Y_2Zn_1$ by polycrystal plasticity

Y.Q. Chi^{1,2}, T. Mayama^{2,3}, G. Garces⁴, and S.R. Agnew²

¹Harbin Institute of Technology, China

²University of Virginia, USA

³Kumamoto University, Japan

⁴National Center of Metallurgical Research, Spain

INV - 02 11:45 - 12:10

LPSO-type Magnesium Alloys Strengthened by Synchronized LPSO Structure

Yoshihito Kawamura

Magnesium Research Center, Japan

ORAL - 02 12:10 - 12:30

Investigation of substitutional behavior of rare-earth elements in LPSO phases

Seiji Miura¹, Futoshi Miyakawa¹, Ken-ichi Ikeda¹, Toshiaki Horiuchi², Takaomi Itoi³ and Satoshi Minamoto⁴

¹Hokkaido University, Japan

²Hokkaido University of Science, Japan

³Chiba University, Japan

⁴National Institute for Materials Science, Japan

Lunchtime 12:30 – 14:00

Oral session - 3
Dec. 5, Monday 14:00 – 15:05, Kyogoku room
Chairperson: Rainer Schmid-Fetzer

INV-03 14:00 - 14:25

Cluster characteristics of the LPSO-structured Mg alloys

Eiji Abe

University of Tokyo, Japan

ORAL - 03 14:25 - 14:45

Self-organization by Strain Accommodation in the Formation of Long-range Stacking Order Structure in in Solute-lean Mg-Zn-(Y, Gd) Alloys

Tadashi Furuhashi and Xinfu Gu

Tohoku University, Japan

ORAL - 04 14:45 - 15:05

X-ray Fluorescence Holography Study on Single Crystal Mg₈₅Zn₆Y₉ LPSO Alloy: Analysis of the Local Structure around Zn

K. Kimura¹, K. Hayashi¹, K. Hagihara², H. Izuno³, N. Happo⁴, S. Hosokawa⁵, M. Suzuki⁶, and H. Tajiri⁶

¹Nagoya Institute of Technology, Japan

²Osaka University, Japan

³Research Center for Advanced Science and Technology, Japan

⁴Hiroshima City University, Japan

⁵Kumamoto University, Japan

⁶Japan Synchrotron Radiation Research Institute, Japan

Coffee break 15:05 - 15:15

Poster session

Dec. 5, Monday 15:15 - 18:00, Fuji room

Chairperson: Takanori Kiguchi

POS - 01

Effect of cooling rate after melting on formation of LPSO structure in Mg₉₇Zn₁RE₂ alloys

Tatsuya Tokunaga¹, Shohei Ikeda¹, Satoshi Iikubo¹, Hiroshi Ohtani² and Hidenori Era¹

Kyushu Institute of Technology, Japan

Tohoku University, Japan

POS - 02

3D phase-field simulation of cluster-microstructure formation in Mg alloy

Keisuke Muramatsu¹, Yuhki Tsukada² and Toshiyuki Koyama²

¹Nagoya Institute of Technology, Japan

²Nagoya University, Japan

POS - 03

Analysis of the local structure in LPSO Mg₇₅Zn₁₀Y₁₅ alloy from X-ray fluorescence holography

T. Nishioka¹, K. Hayashi¹, K. Kimura¹, J. R. Stellhorn¹, N. Happo², K. Hagihara³, H. Izuno⁴, Y. Ebisu⁵, Y. Ideguchi⁶, M. Suzuki⁷, T. Ozaki⁵, S. Hosokawa⁶

¹Nagoya Institute of Technology, Japan

²Hiroshima City University, Japan

³Osaka University, Japan

⁴Research Center for Advanced Science and Technology, Japan

⁵Hiroshima Institute of Technology

⁶Kumamoto University

⁷Japan Synchrotron Radiation Research Institute

POS - 04

Comparison with the composition dependence of the LPSO poly-types formed in Mg-M-Y (M=Ni, Cu and Zn) ternary alloy systems

Takaomi Itoi¹, Takuya Ogaku¹, Atsushi Seo¹, Toshiaki Horiuchi² and Seiji Miura³

¹Chiba University, Japan

²Hokkaido University of Science, Japan

³Hokkaido University, Japan

POS - 05

Influence of Interface Boundary Spacing on Uni-axial Compression Behavior of As-cast Polycrystalline LPSO-type Mg-Zn-Y Alloys

Kentaro Kamura¹, Tsuyoshi Mayama^{1,2}, Michiaki Yamasaki^{3,4} and Yoshihito Kawamura⁴

¹Kumamoto University, Japan

²University of Virginia, USA

³University of Queensland, Australia

⁴Magnesium Research Center, Japan

POS - 06

Inelastic behavior during unloading in as-cast Mg-Zn-Y alloys with LPSO phase

Kazuma Shiraishi¹, Tsuyoshi Mayama^{1,2}, Michiaki Yamasaki^{3,4} and Yoshihito Kawamura⁴

¹Kumamoto University, Japan

²University of Virginia, USA

³University of Queensland, Australia

⁴Magnesium Research Center, Japan

POS - 07

Comparison of creep characteristics of Mg-based LPSO alloy and pure Mg

Hidenari Takagi and Masami Fujiwara

Nihon University, Japan

POS - 08

A novel type of LPSO structure formed in Mg-Ni-Y alloys

K. Yamashita¹, T. Itoi², M. Yamasaki³, Y. Kawamura³ and E. Abe¹

¹University of Tokyo, Japan

²Chiaba University, Japan

³Magnesium Research Center, Japan

POS - 09

**An attempt for detection of slip plane in LPSO phase using Scanning Tunneling
Microscopy**

Shu Kurokawa, Takuto Kobayashi and Akira Sakai

Kyoto University, Japan

POS - 10

**Effects of Kink Formation on High Temperature Creep Strength in a Directionally
Solidified Long-Period Stacking Ordered Mg-Zn-Y Alloy at 600K**

Mayumi Suzuki¹, Ryota Watanabe¹ and Koji Hagihara²

¹Toyama Prefecture University, Japan

²Osaka University, Japan

POS - 11

**Evaluation of deformation and fracture behaviors of extruded Mg-Zn-Y alloys with
AE measurement**

Kengo Tamura, Takayuki Shiraiwa and Manabu Enoki

University of Tokyo, Japan

POS - 12

Investigation of the Novel Long-Period Structures in High-Pressure Synthesized Mg-Zn-Yb Alloy

Naoya Fujita¹, Kenya Yamashita¹, Masahumi Matsushita², Michiaki Yamasaki³, Yoshihito Kawamura³, and Eiji Abe¹

¹University of Tokyo, Japan

²Ehime University, Japan

³Magnesium Research Center, Japan

POS - 13

Local analysis of chemistry and structure in LPSO phases by correlative use of atom probe tomography and transmission electron microscopy

K. Inoue¹, N. Ebisawa¹, K. Tomura¹, K. Yoshida¹, Y. Nagai¹, K. Kishida², H. Inui², H. Izuno³, K. Hagihara³, D. Egusa⁴, E. Abe⁴, M. Yamasaki⁵ and Y. Kawamura⁵

¹Tohoku University, Japan

²Kyoto University, Japan

³Osaka University, Japan

⁴University of Tokyo, Japan

⁵Magnesium Research Center, Japan

POS -14

Formation of an oxide film on extruded Mg₉₇Zn₁Y₂ alloy

Shin-ichi Inoue¹, Michiaki Yamasaki^{1,2}, and Yoshihito Kawamura¹

¹Magnesium Research Center, Japan

²The University of Queensland, Australia

POS - 15

Synthesis of long period super-lattices in Mg-M (Zn, Cu)-Yb alloys under high-pressures and temperatures

Ryota Tsukamoto¹, Masafumi Matsushita¹, Toru Shinmei², Tetsuo Irifune², Michiaki Yamasaki^{3,4}, Yoshihito Kawamura³, Naoya Fujita⁵ and Eiji Abe⁵

¹Ehime University, Japan

²Geodynamics Research Center, Japan

³Magnesium Research Center, Japan

⁴University of Queensland

⁵University of Tokyo

POS - 16

Plastic deformation of layered compounds - A comparison between Mg-LPSO and MAX phases -

Kyosuke Kishida and Haruyuki Inui

Kyoto University, Japan

POS - 17

Dislocation distributions around kink bands in an 18R-LPSO Mg-Zn-Y Single Crystal

Tsubasa Matsumoto¹, Michiaki Yamasaki¹, Koji Hagihara² and Yoshihito Kawamura¹

Kumamoto University, Japan

Osaka University, Japan

POS - 18

A Phonon Mechanism of Ordering of Solute-enriched Layers in LPSO Structures

Daisuke Matsunaka^{1,2} and Yoji Shibutani²

¹Shinshu University

²Osaka University

POS - 19

Local stress inside Mg-based synchronized LPSO phase: *Ab initio* local stress calculation

Yoshinori Shiihara¹ and Masanori Kohyama²

¹Toyota Technological Institute, Japan

²National Institute of Advanced Industrial Science and Technology, Japan

POS - 20

Mechanical characterization of LPSO phase of Mg₈₅Zn₆Y₉ alloy using micro-shear testing

Kohei Kyuma, Yoji Mine, Kazuki Takashima

Kumamoto University, Japan

POS - 21

Effect of kink boundary on tensile deformation behaviour of LPSO phase in $Mg_{85}Zn_6Y_9$ alloy

Kosuke Takagi¹, Yoji Mine¹, Oliver Kraft², Kazuki Takashima¹

¹Kumamoto University, Japan

²Karlsruhe Institute of Technology, Germany

POS - 22

Deformation Behavior of Synchronized-LPSO Phase: Molecular Dynamics Analyses of the Chemical Order Effect

Ryosuke Matsumoto, Yuichiro Nishioka and Masayuki Uranagase

Kyoto University, Japan

POS - 23

Deformation and fracture behavior of Ti_3SiC_2 ceramics by four-point bending test using a thin sheet

Ken-ichi Ikeda and Seiji Miura

Hokkaido University, Japan

POS - 24

ECAP Deformation of Mg-Zn-Y alloys

Hiromoto Kitahara¹, Michiaki Yamasaki², Yota Nakayama¹, Masayuki Tsushida¹, Shinji Ando² and Yoshihito Kawamura²

¹Kumamoto University, Japan

²Magnesium Research Center, Japan

POS - 25

Multi-scale Structure Investigations of Mg-Zn-Gd alloys by XAFS-CT

S. Yoshioka¹, M. Ishida¹, K. Yasuda¹, S. Matsumura¹, S. Kimura², Y. Takeichi³, Y. Niwa³ and M. Kimura³

¹Kyushu University, Japan

²Japan Synchrotron Radiation Research Institute, Japan

³Institute of Materials Structure Science, Japan

POS - 26

Local atomic configurations of 18R type long-period stacking ordered structures in Mg₈₅Y₉Zn₆ alloys examined by EXAFS

Tomohiro Sugino¹, Hiroshi Okuda¹, Hiroto Tanaka¹, Masao Tabuchi², Hajime Kimizuka³, Michiaki Yamasaki⁴ and Yoshihito Kawamura⁴

¹Kyoto University

²Nagoya University

³Osaka University

⁴Magnesium Research Center

POS - 27

Effect of solute composition on the formation kinetics of LPSO structure from rapidly solidified ribbons

Yuki Yasuoka¹, Hiroto Tanaka¹, Hiroshi Okuda¹, Michiaki Yamasaki², Yoshihito Kawamura², Shigeru Kimura³ and Takaaki Hikima³

¹Kyoto University, Japan

²Magnesium Research Center, Japan

³Japan Synchrotron Radiation Research Institute, Japan

POS - 28

Thermodynamic Analysis of Phase Equilibria in the Mg-Al-Sc Ternary System

Shoya Kawano¹, Shuji Hamamoto¹, Tatsuya Tokunaga¹, Satoshi Iikubo¹, Hiroshi Ohtani⁴

¹Kyushu Institute of Technology, Japan

²Tohoku University, Japan

POS - 29

Plastic strain distribution around kink bands in Mg alloys with LPSO phase

T. Morikawa¹, R. Kato¹ and K. Higashida²

¹Kyushu University, Japan

²Sasebo College, Japan

POS - 30

Formation of kink bands in a Mg-6at.%Zn-9at.%Y alloy

R. Kato¹ and T. Morikawa², K. Higashida^{2,3}

¹Kyushu University, Japan

²Sasebo College, Japan

POS -31

Energetic assessment between L1₂ and small clusters in Mg-Zn-Y alloy
Motoyuki Kiyohara, Yuichi Sakamoto, Tatsuro Yoshioka, Shinya Morishita,
and Shigeto R. Nishitani
Kwansei Gakuin University, Japan

POS-32

**Superfine wire processing technology development of
LPSO-type Magnesium Alloys and Non-flammable Magnesium Alloys.**
Taishi Tsuda¹, Yoshihito Kawamura²
¹TOHO KINZOKU CO., LTD.
²Magnesium research center, Japan

POS-33

Trend in Practical Application Development of LPSO Type-magnesium Alloys
Minami Sasaki, Masashi Inoue
Fuji Light Metal Co., Ltd., Japan

Oral session – 4

Dec. 6, Tuesday 09:10 – 10:35, Kyogoku room

Chairperson: Elji Abe

PEL - 03 09:10 - 09:50

GINZBURG-LANDAU THEORY OF LPSO FORMATION

Alexander Umantsev
Fayetteville State University, USA

INV - 04 09:50 - 10:15

Characterization of deformation behavior of synchronized LPSO alloy via in-situ neutron diffraction

Kazuya Aizawa¹, Wu Gon² Stefanus Harjo¹, Jun Abe³, Takuro Kawasaki¹, Takeshi Harada¹
and Takashi Kamiyama⁴
¹Japan Atomic Energy Agency
²Kyoto University
³Neutron Science and Technology Center
⁴Institute of Materials Structure Science

ORAL - 05 10:15 - 10:35

LPSO formation mechanism based on the middle range ordering of small clusters

Motoyuki Kiyohara, Yuichi Sakamoto, Tatsuro Yoshioka, Shinya Morishita,

and Shigeto R. Nishitani

Kwansei Gakuin University, Japan

Coffee break 10:35-10:55

Oral session – 5

Dec. 6, Tuesday 10:55 – 12:25, Kyogoku room

Chairperson: Alexei Vinogradov

PEL - 04 10:55 - 11:35

Disclinations in Ordered Structures

Aleksei E. Romanov^{1,2,3}

¹ITMO University, Russia

²Toffe Physical-Technical Institute RAS, Russia

³Togliatti State University, Russia

INV - 05 11:35 - 12:00

Characteristic deformation behaviors in Mg alloys with the synchronized LPSO structure

K. Higashida^{1,2} and T. Morikawa¹

¹ Kyushu University, Japan

²Sasebo College, Japan

INV - 06 12:00 - 12:25

Mechanism of Formation of Kink Banding Structure in LPSO-Mg

Akihiro Nakatani¹, Xiao-Wen Lei²

¹Osaka University, Japan

²University of Fukui, Japan

Lunchtime 12:25 – 13:55

Oral session – 6
Dec. 6, Tuesday 13:55 – 15:15, Kyogoku room
Chairperson: Alexander Umantsev

PEL - 05 13:55 – 14:35

RIPLOCATIONS: A NEW MICROMECHANISM IN THE DEFORMATION OF LAYERED SOLIDS

Michel W. Barsoum
Drexel University, USA

ORAL - 06 14:35 – 14:55

Variation in deformation behavior of the synchronized LPSO phase with its composition

Koji Hagihara¹, Takuya Okamoto¹, Hitoshi Izuno¹, Michiaki Yamasaki², Masafumi Matsushita³, Yoshihito Kawamura², and Takayoshi Nakano¹

¹Osaka University, Japan

²Magnesium Research Center, Japan

³Ehime University, Japa

ORAL - 07 14:55 - 15:15

Microscopic elastic properties of single crystal Mg₈₅Zn₆Y₉ alloy with long-period stacking ordered phase by inelastic x-ray scattering

Shinya Hosokawa¹, Koji Kimura¹, Koji Hagihara², Hitoshi Izuno², Michiaki Yamasaki³, Yoshihito Kawamura³, Koji Yoshida⁴, Masanori Inui⁵, Hiroshi Uchiyama⁶ and Satoshi Tsutsui⁶

¹Kumamoto University, Japan

²Osaka University, Japan

³Magnesium Research Center, Japan

⁴Fukuoka University, Japan

⁵Hirosima University, Japan

⁶Japan Synchrotron Radiation Research Institute

Coffee break 15:15 - 15:35

Oral session – 7

Dec. 6, Tuesday 15:35 – 17:00, Kyogoku room

Chairperson: Aleksei E. Romanov

PEL - 06 15:35 – 16:15

Kinetics of kink bands in the LPSO phase: in-situ analysis by acoustic emission

Alexei Vinogradov

Norwegian University of Science and Technology, Norway

INV - 07 16:15 – 16:40

Evaluation of deformation and fracture behaviors in LPSO Mg alloys by advanced AE techniques

Manabu Enoki

University of Tokyo, Japan

ORAL - 08 16:40 - 17:00

Measurement of Thermal Expansion Coefficient of $Mg_{97}Zn_1Gd_2$ Cast Alloy with Synchronized Long-period Stacking Ordered Phase

Shigeru Kimura and Nobuhiro Yasuda

Japan Synchrotron Radiation Research Institute, Japan

Group photo 17:40 - 18:00

Banquet 18:00 – 20:00

Oral session – 8
Dec. 7, Wednesday 09:10 – 10:35, Kyogoku room
Chairperson: Akihiro Nakatani

PEL - 07 09:10 – 09:50

On the Structure of LPSO Phase in a Mg-Y-Al Alloy

Hui Zhang¹, Yuman Zhu¹, Chaoqiang Liu², Houwen Chen², Laure Bourgeois¹
and Jian-Feng Nie^{1,2}

¹Monash University, Australia

²Chongqing University, China

INV - 08 09:50-10:15

Microstructural Evolution from Amorphous to LPSO in Mg-Y-Zn and Mg-Gd-Zn Alloys Examined by In-situ Small- and Wide- Angle X-ray Scattering

Hiroshi Okuda¹, Hiroto Tanaka¹, Yuki Yasuoka¹, Michiaki Yamasaki², Yoshihito Kawamura², Nobutaka Shimizu³, Shigeru Kimura⁴ and Takaaki Hikima⁵

¹Kyoto University, Japan

²Magnesium Research Center, Japan

³High Energy Accelerator Organization, Japan

⁴Japan Synchrotron Radiation Research Institute

⁵RIKEN, Japan

ORAL - 09 10:15 - 10:35

In-situ formed nanocomposite from hydrogen-induced decomposition of 18R-type long-period stacking ordered phase in Mg-Ni-Y system

Yang Li, Qian Li, Cheng Liu

Shanghai University, China

Coffee break 10:35 - 10:55

Oral session – 9
Dec. 7, Wednesday 10:55 – 12:15, Kyogoku room
Chairperson: S. R. Agnew

ORAL - 10 10:55 - 11:15

Orientation Dependence of Cyclic Deformation Behavior of Mg₈₅Zn₆Y₉ Alloy with 18R Long-Period Stacking-Ordered Structure

Yuichiro Koizumi¹, Sano Kotaro¹, Akihiko Chiba¹, Koji Hagihara², and Yoshihito Kawamura³

¹Tohoku University, Japan

²Osaka University, Japan

³Magnesium Research Center, Japan

ORAL - 11 11:15 - 11:35

Atomic-scale characterization of segregations at symmetrical kink boundaries in an Mg-Zn-Y alloy

Xiaohong Shao, Zhenzhen Peng, Qianqian Jin and Xiuliang Ma
Shenyang National Laboratory for Materials Science, China

ORAL-12 11:35 - 11:55

Activities of Non-basal Slips in Magnesium and Magnesium - Yttrium alloy

Shinji Ando¹, Hiroaki Rikihisa², Takashi Mori², Masayuki Tsushida² and Hiromoto Kitahara²

¹Magnesium Research Center, Japan

²Kumamoto University

ORAL-13 11:55 - 12:15

Sample size effects and deformation mechanisms of LPSO Mg-Zn-Y Alloy in micro- and nano-meter scales

W. S. Chuang¹, J. C. Huang¹, K. Kyuma², K. Takagi², K. Takashima², T. Y. Liu¹, Y. C. Wu¹

¹National Sun Yat-Sen University, China

²Kumamoto University, Japan

Closing Address 12:15 – 12:25

Kenji Higashida