

## Curriculum Vitae

**Full Name:** Eiji Abe

**Birth:** June 17, 1967

**Sex:** Male **Nationality:** Japan



### Education:

March 1991: Bachelor degree, Materials Science, Tohoku University

March 1993: Master degree, Materials Science, Tohoku University

October 2001: Doctor of Engineering, Tohoku University

### Employment:

April 1993 - March 2005 : Researcher – Senior Researcher

National Institute for Materials Science (NIMS)

January 2002 - January 2003 : Visiting Researcher

Solid State Division, Oak Ridge National Laboratory

April 2005 - February 2016, Associate Professor,

Department of Materials Science & Engineering, University of Tokyo

March 2016 - Present, Professor

Department of Materials Science & Engineering, University of Tokyo

April 2016 - Present, Team Leader (Cross Appointment)

Research Center for Structural Materials,

National Institute for Materials Science

April 2021 - Present, Department Head

Department of Materials Science & Engineering, University of Tokyo

### Field of expertise:

Microstructures of alloys, Phase transformations in alloys, Electron microscopy (TEM/STEM), X-ray/electron diffraction, Crystallography of alloys/inorganic compounds, Computer simulations/first-principles calculations, Magnesium alloys, Aluminum alloys, Rare-earth compounds, Quasicrystals

## Selected Publications

### LPSO-Mg alloys

- [1] D. Egusa, R. Manabe, T. Kawasaki, H. Stefanus, S. Sato, E. Abe, “Quantitative X-ray diffraction analysis of solute-enriched stacking faults in hcp-Mg alloys based on peak asymmetry analysis”  
*Materials Today Communications*, 31 (2022), 103344.
- [2] K. Guan, D. Egusa, E. Abe, “Dilute long period stacking/order (LPSO)-variant phases along the composition gradient in a Mg-Ho-Cu alloy”  
*Journal of Magnesium and Alloys*, 10 (2022), 1573 - 1580.
- [3] K. Guan, M. Egami, D. Egusa, H. Kimizuka, M. Yamasaki, Y. Kawamura, E. Abe, “Short-range order clusters in the long-period stacking/order phases with an intrinsic-I type stacking fault in Mg-Co-Y alloys”  
*Scripta Materialia*, 207 (2022), 114282.
- [4] M. Itakura, M. Yamaguchi, D. Egusa, E. Abe, “Density functional theory study of solute cluster growth processes in Mg-Y-Zn LPSO alloys”  
*Acta Materialia*, 203 (2021), 116491.
- [5] M. Egami, I. Ohnuma, M. Enoki, H. Ohtani, E. Abe,  
“Thermodynamic origin of solute-enriched stacking-fault in dilute Mg-Zn-Y alloys”  
*Materials and Design*, 188 (2020), 108452.
- [6] D. Egusa, K. Kawaguchi, E. Abe, “Direct observations of precursor short-range order clusters of solute in a LPSO-Forming Mg-Zn-Gd ternary alloy”  
*Frontiers in Materials*, 6 (2019), 266.
- [7] K. Yamashita, T. Itoi, M. Yamasaki, Y. Kawamura, E. Abe,  
“A novel long-period stacking/order structure in Mg-Ni-Y alloys”  
*Journal of Alloys and Compounds*, 788 (2019), 277.
- [8] T. Nishioka, Y. Yamamoto, K. Kimura, K. Hagihara, H. Izuno, N. Happo, S. Hosokawa, E. Abe,  
M. Suzuki, T. Matsushita, K. Hayashi “In-plane positional correlations among dopants in 10H-type long period stacking ordered Mg<sub>75</sub>Zn<sub>10</sub>Y<sub>15</sub> alloy studied by X-ray fluorescence holography”  
*Materialia*, 3 (2018), 193.
- [9] M. Matsushita, R. Inugai, M. Yamasaki, T. Shinmei, Y. Kawamura, T. Irifune, N. Fujita, E. Abe,  
“A long-period superlattice phase in Mg<sub>97</sub>Zn<sub>1</sub>Yb<sub>2</sub> alloys synthesized under high-pressure”  
*Scripta Materialia*, 121 (2016), 45.
- [10] M. Egami, E. Abe, “Structure of a novel Mg-rich complex compound in Mg-Co-Y ternary alloys”  
*Scripta Materialia*, 98 (2015), 64.
- [11] M. Yamasaki, M. Matsushita, K. Hagihara, H. Izuno, E. Abe, Y. Kawamura,  
“Highly ordered 10H-type long-period stacking order phase in a Mg-Zn-Y ternary alloy”  
*Scripta Materialia*, 78-79 (2014), 13.

- [12] D. Egusa, M. Yamasaki, Y. Kawamura, E. Abe,  
“Micro-kinking of the LPSO phase in a hot-extruded Mg<sub>97</sub>Zn<sub>1</sub>Y<sub>2</sub> alloy”  
*Materials Transactions*, 54 (2013), 698.
- [13] D. Egusa, E. Abe, “The structure of long period stacking/order Mg–Zn–RE phases with extended non-stoichiometry ranges”  
*Acta Materialia*, 60 (2012), 166.
- [14] E. Abe, A. Ono, T. Itoi, M. Yamasaki, Y. Kawamura, “Polytypes of long-period stacking structures synchronized with chemical order in a dilute Mg-Zn-Y alloy”  
*Philosophical Magazine Letters*, 91 (2011), 690.
- [15] E. Abe, Y. Kawamura, K. Hayashi, A. Inoue, “Long-period ordered structure in a high-strength nanocrystalline Mg-1at.%Zn-2at.%Y alloy studied by atomic-resolution Z-contrast STEM”  
*Acta Materialia*, 50 (2002), 3845.

### **Quasicrystals**

- [1] T. Seki, E. Abe, “Local cluster symmetry of a highly ordered quasicrystalline Al<sub>58</sub>Cu<sub>26</sub>Ir<sub>58</sub> extracted through multivariate analysis of STEM images”  
*Microscopy*, 64 (2015), 341.
- [2] T. Ors, H. Takakura, E. Abe, W. Steurer, “The quasiperiodic average structure of highly disordered decagonal Zn-Mg-Dy and its temperature dependence”  
*Acta Crystallographica B*, 70 (2014), 315.
- [3] E. Abe, “Electron microscopy of quasicrystals - where are the atoms?”  
*Chemical Society Reviews*, 41 (2012), 6787.
- [4] E. Abe, Y. Yan, S. J. Pennycook, “Quasicrystal as cluster aggregates” Review: with Cover page  
*Nature Materials*, 3 (2004), 759.
- [5] E. Abe, S. J. Pennycook, A. P. Tsai, “Direct observation of a local thermal vibration anomaly in a quasicrystal”,  
*Nature*, 421 (2003), 347.
- [6] E. Abe, K. Saitoh, H. Takakura, A. P. Tsai, P. J. Steinhardt, “Quasi-Unit Cell Model for an Al-Ni-Co Ideal Quasicrystal based on Clusters with Broken 10-fold Symmetry”  
*Physical Review Letters*, 84 (2000), 4609.
- [7] A. P. Tsai, J. Q. Guo, E. Abe, H. Takakura, T. J. Sato, “A stable binary quasicrystal”  
*Nature*, 408 (2000), 537.
- [8] J. Q. Guo, E. Abe, A. P. Tsai, “Stable icosahedral quasicrystals in binary Cd-Ca and Cd-Yb systems”  
*Physical Review B*, 82 (2000), R14605.
- [9] E. Abe, T. J. Sato, A. P. Tsai, “Structure of a quasicrystal without atomic clusters”  
*Physical Review Letters*, 82 (1999), 5269.
- [10] E. Abe, A. P. Tsai, “Quasicrystal-Crystal transformation in Zn-Mg-rare-earth alloys”  
*Physical Review Letters*, 83 (1999), 753.

- [11] P. J. Steinhardt, H. C. Jeong, K. Saitoh, M. Tanaka, E. Abe, A. P. Tsai, “Experimental verification of the quasi-unit cell model of quasicrystal structure”

*Nature*, 396 (1998), 55.

### **STEM & others**

- [1] R. Ishikawa, E. Okunishi, H. Sawada, Y. Kondo, F. Hosokawa, E. Abe, “Direct imaging of hydrogen-atom columns in a crystal by annular bright-field electron microscopy”  
*Nature Materials*, 10 (2011), 278.
- [2] M. Varela, A. R. Lupini, K. van Benthem, A. Y. Borisevich, M. F. Chisholm, N. Shibata, E. Abe, S. J. Pennycook, “Materials characterization in the aberration-corrected scanning transmission electron microscope”  
*Annual Review of Materials Research*, 35 (2005), 539.
- [3] R. Yoshimura, T. J. Konno, E. Abe, K. Hiraga, “Transmission electron microscopy study of the evolution of precipitates in aged Al-Li-Cu alloys: the  $\theta'$  and  $T_1$  phases”  
*Acta Materialia*, 51 (2003), 4251.
- [4] R. Yoshimura, T. J. Konno, E. Abe, K. Hiraga, “Transmission electron microscopy study of the early stage of precipitates in aged Al-Li-Cu alloys”  
*Acta Materialia*, 51 (2003), 2891.
- [5] M. Imai, E. Abe, J. Ye, K. Nishida, T. Kimura, K. Honma, H. Abe, H. Kitazawa “Superconductivity of Ternary Silicide with the  $AlB_2$ -Type Structure  $Sr(Ga_{0.37}Si_{0.63})_2$ ”  
*Physical Review Letters*, 87 (2001), 077003.
- [6] M. Ohnuma, K. Hono, E. Abe, H. Onodera, S. Mitani, H. Fujimori, “Microstructure of Co-Al-O granular thin films”  
*Journal of Applied Physics*, 82 (1997), 5646.