

Curriculum Vitae

1. Basic Information

(1) Personal Information

Lee, Je In
Assistant professor
Pusan National University



(2) Contacts

OFFICE: Room 2304-2, Engineering Building #2, Pusan National University,
2, Busandaehak-ro 63 beon-gil, Geumjeong-gu, Busan 46241, Republic of Korea
MOBILE: +82-10-3099-6035
E-mail: jilee@pnu.ac.kr

(3) Education

Ph. D. 2016 Materials Science and Engineering, Seoul National University, Republic of Korea
B. S. 2010 Materials Science and Engineering, Seoul National University, Republic of Korea

(4) Appointments

Assistant professor	Pusan National University	Sep.2019 -
ICYS research fellow	International Center for Young Scientist, National Institute for Materials Science, Japan (Prof. Koichi Tsuchiya and Prof. Hideyuki Murakami / Topic: High-entropy alloy design)	Mar. 2017-Aug.2019
Postdoctoral researcher	Research Institute of Advanced Materials, Seoul National University (In-situ synthesis of MMCs)	Sep. 2016-Feb. 2017
Visiting scholar	Lawrence Berkeley National Laboratory, U.S. (Prof. Robert O. Ritchie / Topic: Bio-mimetic MMCs)	Oct. 2014–Mar. 2015
Visiting scholar	National Institute for Materials Science, Japan (Prof. Koichi Tsuchiya / Topic: Effect of HPT on MMCs)	Jul. 2013–Sep. 2013

(5) Research Interests

1. Design and synthesis of bioinspired metal-ceramic hybrid materials
2. High-entropy alloy design for structural and functional applications
3. Mechanical and thermal properties of alloys and composites

(6) Experimental skills

1. Alloy preparation: Plasma arc melting, vacuum induction melting, suction casting, melt spinning
2. Thermo-mechanical processing: Multi-pass caliber rolling, high pressure torsion
3. Microstructural analysis: Scanning electron microscope, electron backscatter diffraction
4. Mechanical characterization; Tensile, compressive, three-point bending, charpy impact, nano-indentation test
5. Thermal analysis: Differential scanning calorimetry, thermo-mechanical analysis, dynamic mechanical analysis, laser flash analysis

(7) Honors and Awards

Awards

1. Excellent poster award, KIM Fall Meeting, Oct. 2020
2. Excellent poster award, World Congress on High Entropy Alloys 2019, Nov. 2019
3. Microstructure Photography Award (academic field), Microstructure Photography Contest, KIM Spring Meeting, Apr. 2019
4. Excellent poster award, BMG XII, May. 2018
5. Excellent poster award, KIM Fall Meeting, Oct. 2016
6. Excellent poster award, KIM Fall Meeting, Oct. 2016
7. Excellent oral presentation award. Student symposium, KIM Fall Meeting, Oct. 2016
8. Excellent poster award, ISMANAM 2016, Jul. 2016
9. Excellent oral presentation award. Student symposium, KIM Spring Meeting, Apr. 2016
10. Excellent poster award, KIM Spring Meeting, Apr. 2016
11. Excellent oral presentation award. Student symposium, KIM Fall Meeting, Oct. 2015
12. Excellent poster award, KIM Spring Meeting, Apr. 2015
13. Excellent poster award, KIM Spring Meeting, Apr. 2014
14. Excellent poster award, KIM Fall Meeting, Oct. 2012
15. Microstructure Photography Award (technology field), Microstructure Photography Contest, KIM Spring Meeting, Apr. 2012
16. Excellent poster award, IUMRS international conference in Asia, Sep. 2011
17. Young scientist award, the 6th Asia Region International Workshop on Quasicrystals, May. 2011
18. Excellent poster award, KIM Spring Meeting, Apr. 2011
19. Excellent poster award, IUMRS international conference in Asia, Sep. 2010

Scholarship

1. SNU support program for long-term overseas training, Ritchie group, Lawrence Berkeley National Laboratory, United States, Oct. 2014 – Mar. 2015
2. NIMS Internship Program Fellowship, Microstructure design group, National Institute of Materials Science, Japan, Jul. 2013 – Sep. 2013
3. National S&T (Science & Technology) Scholarship, Mar. 2006 – Feb. 2010

2. Research

(1) Publications

Papers Published in International Journals

1. **J.I. Lee**, W.H. Ryu, K.N. Yoon, E.S. Park, "In situ synthesis of Mg-based bulk metallic glass matrix composites with primary α -Mg phases", *Journal of Alloys and Compounds*, **879**, (2021) 160417, doi: [10.1016/j.jallcom.2021.160417](https://doi.org/10.1016/j.jallcom.2021.160417)
2. **J.I. Lee**, K. Tsuchiya, W. Tasaki, H.S. Oh, T. Sawaguchi, H. Murakami, T. Hiroto, Y. Matsushita, E.S. Park, "A strategy of designing high-entropy alloys with high-temperature shape memory effect", *Scientific Reports*, **9** (2019) 13140, doi: [10.1038/s41598-019-49529-8](https://doi.org/10.1038/s41598-019-49529-8)
3. **J.I. Lee**, A. Wat, J. Kim, C. W. Ryu, H.J. Chang, E.S. Park, R.O. Ritchie, "Synthesis of bioinspired ice-templated bulk metallic glass-alumina composites with intertwined dendritic structure", *Scripta Materialia*, **172** (2019) 159-164, doi: [10.1016/j.scriptamat.2019.07.023](https://doi.org/10.1016/j.scriptamat.2019.07.023)
4. A. Wat*, **J.I. Lee***, C.W. Ryu, B. Gludovatz, J.Y. Kim, A. P. Tomsia, T. Ishikawa, J. Schmitz, A. Meyer, E.S. Park, R.O. Ritchie, "Bioinspired nacre-like alumina with a bulk-metallic glass-forming alloy as a compliant phase", *Nature Communications*, **10** (2019) 961, doi: [10.1038/s41467-019-08753-6](https://doi.org/10.1038/s41467-019-08753-6) (***Equally contributing first author**)
5. H.J. Chang, H.S. Oh, **J.I. Lee**, E.S. Park, "Structural signature and size-dependent mechanical response of frozen-in icosahedral phase in bulk metallic glasses", *Materials & Design*, **138** (2018) 129-139, doi: [10.1016/j.matdes.2017.10.049](https://doi.org/10.1016/j.matdes.2017.10.049) (**Best paper in XAFS division, KOSUA 2018 spring**)
6. **J.I. Lee**, E.S. Park, "In-situ synthesis of co-continuous aluminum-aluminum nitride composites by arc plasma-induced accelerated displacement reaction", *Journal of Alloys and Compounds*, **729**, (2017) 171-179, doi: [10.1016/j.jallcom.2017.09.159](https://doi.org/10.1016/j.jallcom.2017.09.159)
7. **J.I. Lee**, E.S. Park, "In-situ synthesis and mechanical properties of Zr-based bulk metallic glass

matrix composites manipulated by nitrogen additions”, *Intermetallics*, **91**, (2017) 70-77, doi: [10.1016/j.intermet.2017.08.005](https://doi.org/10.1016/j.intermet.2017.08.005)

8. **J.I. Lee**, E.S. Park, “In-situ synthesis of cold-rollable aluminum-aluminum nitride composites via arc plasma-induced accelerated volume nitridation”, *Journal of Materials Research*, **32**, (2017) 217-226, doi: [10.1557/jmr.2016.422](https://doi.org/10.1557/jmr.2016.422) (**Special issue: Early Career Scholar**)
9. **J.I. Lee**, H.S. Oh, E.S. Park, “Manipulation of σ_y/κ ratio in single phase FCC solid-solutions” *Applied Physics Letters*, **109**(6), (2016) 061906, doi: [10.1063/1.4960809](https://doi.org/10.1063/1.4960809)
10. **J.I. Lee**, J.W. Kim, H.S. Oh, J.S. Park, E.S. Park, “Abnormal devitrification behavior and mechanical response of cold-rolled Mg-rich Mg-Cu-Gd metallic glasses”, *Acta Materialia*, **116** (2016) 238-249, doi: [10.1016/j.actamat.2016.06.026](https://doi.org/10.1016/j.actamat.2016.06.026)
11. S.J. Kang, T.-H. Kim, C.W. Yang, **J.I. Lee**, E.S. Park, T.W. Noh, M.Y. Kim, “Atomic structure and growth mechanism of T₁ precipitate in Al-Cu-Li-Mg-Ag alloy”, *Scripta Materialia*, **109** (2015) 68-71, doi: [10.1016/j.scriptamat.2015.07.020](https://doi.org/10.1016/j.scriptamat.2015.07.020)
12. J.W. Kim, **J.I. Lee**, D.S. Park, E.S. Park, “Enhancement of interface anchoring and densification of Y₂O₃ coating by metal substrate manipulation in aerosol deposition process”, *Journal of Applied Physics*, **117**(1) (2015) 014903, doi: [10.1063/1.4905241](https://doi.org/10.1063/1.4905241)
13. M. Mansouri, A. Simchi, **J.I. Lee**, E.S. Park, N. Varahram, “Non-isothermal kinetic studies of crystallization in amorphous Al₈₆Ni₁₀MM₄ alloy”, *Journal of Non-Crystalline Solids*, **387** (2014) 36-40, doi: [10.1016/j.jnoncrysol.2013.12.027](https://doi.org/10.1016/j.jnoncrysol.2013.12.027)
14. J.S. Kyeong, D.H. Kim, **J.I. Lee**, E.S. Park, “Effects of alloying elements with positive enthalpy of mixing in Mg₆₅Cu₂₅Gd₁₀ bulk-forming metallic glass”, *Intermetallics*, **31** (2012) 9-15, doi: [10.1016/j.intermet.2012.04.008](https://doi.org/10.1016/j.intermet.2012.04.008)

Papers Published in Korean Journals

1. W. Kim, J. Kim, **J.I. Lee**, E.S. Park, “Development of Al-Based Metallic Glass Composites Containing Pb-Rich Crystalline 2nd Phase”, *Korean Journal of Metals and Materials*, **58**, 2 (2020) 77-86 (**SCIE**)
2. H.J. Chang, H.S. Oh, **J.I. Lee**, E.S. Park, “비정질 합금에서 frozen-in Icosahedral 상의 크기에 따른 구조 및 기계적 특성 변화 연구”, *Synchrotron radiation science & technology*, **25**, 2 (Summer 2018) 27-30. (Article, ISSN 1975-7646)
3. **J.I. Lee**, H.S. Oh, J.H. Kim, and E.S. Park, “Effect of configurational entropy on thermophysical properties in single phase FCC solid solutions with multi-principal elements” *Korean Journal of Metals and Materials*, **55** (2017) 1-9 (**SCIE, Cover image**)
4. **J.I. Lee**, J.S. Kyeong, J.I. Yoon, and E.S. Park, “Synthesis of Al/AlN composites by gas-melt in-situ reaction through arc melting”, *Trends in Metals & Materials Engineering*, **24** (2011) 32-37.

(2) Intellectual Properties

International Patents

1. **J.I. Lee**, K. Tsuchiya, T. Sawaguchi, H. Murakami, “形状記憶合金、その製造方法、および、それを用いた用途”, Japan, 2018-092846 May 14 2018 (Applied)
2. K.N. Yoon, K. Yaqoob, **J.I. Lee**, J.Y. Kim, E.S. Park, “High-entropy alloy foam and manufacturing method for the foam”, USA, US 10,941,463 B2, Mar 09 2021 (**Registered**)
3. K.N. Yoon, **J.I. Lee**, W.H. Ryu, G.H. Yoo, E.S. Park, “Water-leachable alloy melt swapping process and the porous metals fabricated by this method”, USA, US 10,538,826 B2, Jan 21 2020 (**Registered**)
4. **J.I. Lee**, W.H. Ryu, J.S. Kyeong, C.W. Ryu, H.S. Oh, E.S. Park, “Manufacturing method for Al-AlN or Al alloy-AlN composite material”, PCT International, #PCT/KR 2012/001304 Feb. 21, 2012 (Applied)

Korean Patents

1. K.N. Yoon, H.S. Oh, **J.I. Lee**, E.S. Park, “Stress sensing deformation mechanism tunable alloy and manufacturing method thereof”, Republic of Korea, KR No. 10-1913029, Oct 23 2018 (**Registered**)
2. H.S. Oh, W.H. Ryu, **J.I. Lee**, H.J. Chang, E.S. Park, “Manufacturing method for work hardenable metallic glass matrix composite”, Republic of Korea, KR No. 10-1908962, Oct 11 2018 (**Registered**)
3. K.N. Yoon, **J.I. Lee**, E.S. Park, “Low thermal expansion and high thermal conductivity composite,

- and the manufacturing method thereof”, Republic of Korea, KR No. 10-1887207, Aug 03 2018 **(Registered)**
4. K.N. Yoon, **J.I. Lee**, E.S. Park, “Water-leachable alloy melt swapping process and the porous metals fabricated by this method”, Republic of Korea, KR No. 10-1855587, Apr 30 2018 **(Registered)**
 5. **J.I. Lee**, C.W. Ryu, E.S. Park, “Ceramic-metal composites and manufacturing method for the same”, Republic of Korea, KR No. 10-1806309, Dec 01 2017 **(Registered)**
 6. **J.I. Lee**, H.S. Oh, E.S. Park, “Fabricating method for strong-ductile bulk metallic glass matrix composites and composite materials for the method”, Republic of Korea, KR No. 10-1788958, Oct 16 2017 **(Registered)**
 7. K.N. Yoon, **J.I. Lee**, E.S. Park, “High-entropy-alloy foam and manufacturing method for the foam”, Republic of Korea, KR No. 10-1684856, Dec 05 2016 **(Registered)**
 8. **J.I. Lee**, E.S. Park, “Fabricating Method for Nitride Reinforced Metal Matrix Composite Materials by Spontaneous Substitution Reaction and Composite Materials Fabricated by the Method”, Republic of Korea, KR No. 10-1659188, Sep 13 2016 **(Registered)**
 9. C.W. Ryu, **J.I. Lee**, H.S. Oh, W. Kim, E.S. Park, Mehdi Mansouri Hasan Abadi, Nasser Varahram, “Al-based bulk metallic glass with misch metal and conductive paste composition using the same” Republic of Korea, KR No. 10-1575637, Dec 02 2015 **(Registered)**
 10. **J.I. Lee**, H.S. Oh, W.H. Ryu, E.S. Park, “Fabricating method for nitride reinforced bulk metallic glass matrix composite material and composite material fabricated by the method” Republic of Korea, KR No. 10-1573705, Nov 26 2015 **(Registered)**
 11. C.W. Ryu, H.S. Oh, **J.I. Lee**, E.S. Park, “Evaluating method for thermoplastic formability of metallic glass in supercooled liquid region”, Republic of Korea, KR No. 10-1348340, Nov 15 2013 **(Registered)**
 12. **J.I. Lee**, W.H. Ryu, J.S. Kyoeng, E.S. Park, “Manufacturing method for Al-AlN or Al alloy-AlN composite material”, Republic of Korea, KR No. 10-1267793, May. 21, 2013 **(Registered)**
 13. **J.I. Lee**, J.W. Kim, N.Y. Kim, E.S. Park, “Ceramic coating method for corrosion resistant member”, Republic of Korea, KR No. 10-1254618, Apr. 09, 2013 **(Registered)**
 14. **J.I. Lee**, C.W. Ryu, E.S. Park, “Magnesium-based Amorphous Magnetic Alloy”, Republic of Korea, KR No. 10-1232030, Feb. 05, 2013 **(Registered)**

(3) Contributed Talks

International Conferences

1. “Synthesis of bioinspired metallic glass-alumina composites” **J.I. Lee**, A. Wat, C.W. Ryu, J. Kim, E.S. Park, R.O. Ritchie, *THERMEC 2021*, Virtual conference, Austria, Jun 01-04 2021 **(Invited)**
2. “Synthesis of bulk metallic glass-alumina composites with intertwined dendritic structure” **J.I. Lee**, A. Wat, C.W. Ryu, J. Kim, E.S. Park, R.O. Ritchie, *TMS 2021*, Virtual conference, USA, Mar 15-18 2021
3. “Shape memory effect in the CrMnFeCoNi alloy system” **J.I. Lee**, K. Tsuchiya, W. Tasaki, H.S. Oh, T. Sawaguchi, H. Murakami, T. Hiroto, Y. Matsushita, E.S. Park, *World Congress on High Entropy Alloys 2019*, Seattle, Washington, USA, Nov 17-20 2019
4. “Shape memory effect in a CrMnFeCoNi high-entropy alloy” **J.I. Lee**, K. Tsuchiya, W. Tasaki, H.S. Oh, T. Sawaguchi, H. Murakami, T. Hiroto, Y. Matsushita, E.S. Park, *8th NU-NIMS Materials Genome Workshop*, Evanston, Illinois, USA, Mar 25-28 2019 **(Invited)**
5. “Synthesis of bio-inspired metallic glass-ceramic composites via pressureless melt infiltration”, **J.I. Lee**, A. Wat, C.W. Ryu, E.S. Park, R.O. Ritchie, *2019 JIM Spring meeting*, Tokyo, Japan, Mar 20-22, 2019
6. “High entropy alloy foam: open a new era of thermal protection utilizing metals”, K.N. Yoon, K. Yaqoob, **J.I. Lee**, J. Kim, S.H. Kim, **E.S. Park**, *TMS 2019*, San Antonio, Texas, USA, Mar. 10-14, 2019
7. “Fabrication of a metal-ceramic composite with nacre-like architecture” **J.I. Lee**, C.W. Ryu, A. Wat, E.S. Park, R.O. Ritchie, *MANA International Symposium 2019*, Ibaraki, Tsukuba, Japan, Mar. 04-06, 2019
8. “Influence of Co/Ni ratio on the microstructure and mechanical properties of CrMnFeCoNi-based

- high-entropy alloys”, **J.I. Lee**, W. Tasaki, H. Murakami, K. Tsuchiya, *ICHEM 2018*, Jeju, Republic of Korea, Dec 09-12, 2018
9. “Nanograin Formation and Phase Transformation in High-Entropy Alloys”, **K. Tsuchiya**, J. Qiang, **J.I. Lee**, *ICHEM 2018*, Jeju, Republic of Korea, Dec 09-12, 2018
 10. “Effect of Ni content on the mechanical properties of CrMnFeCoNi high-entropy alloys”, **J.I. Lee**, W. Tasaki, H. Murakami, K. Tsuchiya, *2018 JIM Fall meeting*, Sendai, Miyagi, Japan, Sep 19-21, 2018
 11. “Exploring Opportunity of High Entropy Alloys: Microstructure Control, High Temperature Oxidation Resistance and Stacking Fault Energy”, **K. Tsuchiya**, J. Qiang, **J.I. Lee**, H. Murakami, *Thermec 2018*, Paris, France, Jul 08-13
 12. “Structural signature and size-dependent mechanical response of frozen-in icosahedral phase in bulk metallic glasses”, **H.J. Chang**, H.S. Oh, **J.I. Lee**, E.S. Park, *BMG XII*, Seoul, Republic of Korea, May. 27-31, 2018.
 13. “Investigating phase separation behavior of high entropy alloys via experimental and calculational approaches” **K.N. Yoon**, Khurram Yaqoob, **J.I. Lee**, J.Y Kim¹, E.S. Park, *BMG XII*, Seoul, Republic of Korea, May. 27-31, 2018.
 14. “Fabricating metallic foam by liquid metal dealloying process with water leachable Ca based metallic glass melt”, **K.N. Yoon**, **J.I. Lee**, E.S. Park, *BMG XII*, Seoul, Republic of Korea, May. 27-31, 2018 (**Poster Award**)
 15. “Development of high-entropy alloys with low stacking fault energy for cryogenic applications” **J.I. Lee**, W. Tasaki, H. Murakami, K. Tsuchiya, *7th NU-NIMS Materials Genome Workshop*, Evanston, Illinois, USA, Mar 26-28 2018 (**Invited**)
 16. “Influence of stacking fault energy on mechanical properties of Cr-Mn-Fe-Co-Ni high-entropy alloys” **J.I. Lee**, W. Tasaki, H. Murakami, K. Tsuchiya, *2018 JIM Annual Spring meeting*, Chiba Institute of Technology, Chiba, Japan Mar 19-21 2018
 17. “Experimental measurement of pseudo-binary phase diagram of FeCoCrNi-Cu complex concentrated alloys”, **K.N. Yoon**, K. Yaqoob, **J.I. Lee**, J.Y.Kim, E.S. Park, *2018 TMS*, Phoenix, Arizona, USA, Mar. 11 - 15, 2018.
 18. “Ultra-low thermal conductive metallic material: High entropy alloy foam”, **K.N. Yoon**, **J.I. Lee**, E.S. Park, *2018 TMS*, Phoenix, Arizona, USA, Mar. 11 - 15, 2018.
 19. “Synthesis of bio-inspired hybrid materials with ceramic brick and metallic mortar”, **J.I. Lee**, E.S. Park, A. Wat, B. Gludovatz, R.O. Ritchie, *2018 MANA International Symposium*, Tsukuba, Japan, Mar. 5-7, 2018
 20. “Development of novel high-entropy alloys with low stacking fault energy”, **J.I. Lee**, H.S. Oh, E.S. Park, H. Murakami, K. Tsuchiya, *2017 JIM Annual Fall meeting*, Hokkaido University, Sapporo, Japan, Sep. 6-8, 2017.
 21. “Experimental measurement of pseudo-binary phase diagram of FeCoCrNi-Cu complex concentrated alloys”, **K.N. Yoon**, K. Yaqoob, **J.I. Lee**, J.Y.Kim, E.S. Park, *RQ16 conference*, Leoben, Austria, Aug. 27- Sep. 1, 2017.
 22. “Development of high-entropy alloy foam with ultra-low thermal conductivity and high strength”, **K.N. Yoon**, **J.I. Lee**, E.S. Park, *2017 TMS*, San Diego, California, USA, Feb 26-Mar 02 2017
 23. “Construction of pseudo binary phase diagram in FeCoCrNi-Cu high-entropy alloy system”, **K.N. Yoon**, **J.I. Lee**, J.Y. Kim, K. Yaqoob, E.S. Park, *2017 TMS*, San Diego, California, USA, Feb 26-Mar 02 2017
 24. “Fabrication and characterization of bioinspired alumina with a bulk metallic glass matrix”, **A. Wat**, **J.I. Lee**, B. Gludovatz, E.S. Park, R.O. Ritchie, *2017 TMS*, San Diego, California, USA, Feb 26-Mar 02 2017
 25. “Synthesis and characterization of bioinspired freeze-cast alumina with a Zr-based bulk metallic glass matrix”, **A. Wat**, **J.I. Lee**, B. Gludovatz, E.S. Park, R.O. Ritchie, *2017 TMS*, San Diego, California, USA, Feb 26-Mar 02 2017
 26. “Manipulation of σ_y/κ ratio in single phase FCC solid-solutions”, **J.I. Lee**, H.S. Oh, **E.S. Park**, *2016 MRS Fall meeting*, Boston, USA, Nov 27–Dec 02, 2016

27. "Phase evolution in HEA-Cu pseudo binary system", K.N. Yoon, **J.I. Lee**, J.Y. Kim, K. Yaqoob, E.S. Park, *ISMANAM 2016*, Nara, Japan, July 3-8 2016
28. "Synthesis of porous metal by liquid metal dealloying process", K.N. Yoon, **J.I. Lee**, E.S. Park, *ISMANAM 2016*, Nara, Japan, July 3-8 2016 (**Poster Award**)
29. "Hardening effect by manipulation configurational entropy in W-based single solid solutions", I.H. Kim, **J.I. Lee**, E.S. Park, *KSTAR Conference 2016*, Daejeon, Republic of Korea, Feb 24-26 2016
30. "Effect of configurational entropy on mechanical and thermal properties of single phase fcc solid solutions", **J.I. Lee**, H.S. Oh, I.H. Kim, E.S. Park, *KSTAR Conference 2016*, Daejeon, Republic of Korea, Feb 24-26 2016
31. "Development of Bio-inspired hybrid composite with ceramic brick and BMG mortar structure", **J.I. Lee**, E.S. Park, A. Wat, R. O. Ritchie, *2016 TMS*, Nashville, Tennessee, USA, Feb 14-18, 2016.
32. "Alloy design strategy of high entropy alloys based on mechanical-thermophysical properties", **J.I. Lee**, H.S. Oh, J.H. Kim, E.S. Park, *2016 TMS*, Nashville, Tennessee, USA, Feb 14-18, 2016.
33. "Fabrication and characterization of ice-templated Alumina/Zr-based bulk metallic glass for bioinspired materials", A. Wat, **J.I. Lee**, B. Gludovatz, E.S. Park, R. O. Ritchie, *6th International Conference on Mechanics of Biomaterials and Tissues*, Hawaii, USA, Dec 6-10 2015
34. "Severe plastic deformation of bulk metallic glass composites by high pressure torsion", **J.I. Lee**, H.S. Oh, E.S. Park, J.K. Lee and K. Tsuchiya, *IU-MRS ICAM 2015*, Jeju, Republic of Korea, Oct 25-29 2015
35. "Development of Bulk Metallic Glass Matrix Bio-inspired Hybrid Composites", **J.I. Lee**, E.S. Park, A. Wat and R.O. Ritchie, *IU-MRS ICAM 2015*, Jeju, Republic of Korea, Oct 25-29 2015 (**Poster award nominated**)
36. "New strategy for designing radiation tolerant high entropy alloy", I.H. Kim, **J.I. Lee**, H.S. Oh, E.S. Park, *IUMRS-ICAM 2015*, Jeju, Republic of Korea, Oct 25-29 2015
37. "Entropic effect of mechanical thermal properties in W-Ta binary alloy system", I.H. Kim, **J.I. Lee**, H.S. Oh, E.S. Park, *IUMRS-ICAM 2015*, Jeju, Republic of Korea, Oct 25-29 2015
38. "Improvement of thermal stabilities in Al-based metallic glass by controlling configurational entropy of solute elements", W. Kim, **J.I. Lee**, E.S. Park, *ISMANAM 2015*, Paris, France, Jul 13-17 2015
39. "Development of BCC W-TM High Entropy Alloy with Low Activation Elements", I.H. Kim, H.S. Oh, **J.I. Lee**, E.S. Park, G.W. Lee, *ISMANAM 2015*, Paris, France, Jul 13-17 2015
40. "Development of Tungsten Alloys for Fusion Reactor Divertor by Utilizing High Entropy Alloy Concept", I.H. Kim, H.S. Oh, **J.I. Lee**, E.S. Park, *KSTAR Conference 2015*, Daejeon, Republic of Korea, Feb 25-27 2015
41. "Effect of high pressure torsion process on microstructure and mechanical properties of bulk metallic glass" **J.I. Lee**, H.S. Oh, E.S. Park, J.K. Lee, K. Tsuchiya, *2014 MRS Fall meeting*, Boston, USA, Nov 30-Dec 5, 2014
42. "Fabrication of Zr-based bulk metallic glass matrix composites with network architecture", **J.I. Lee**, E.S. Park, V. Naglieri, A. Wat, R. Ritchie, *2014 MRS Fall meeting*, Boston, USA, Nov 30-Dec 5, 2014
43. "Investigation of T₁ precipitate structure in Al-5.1Li-1.9Cu- 0.28Mg-0.2Ag alloy", S.J. Kang, **J.I. Lee**, E.S. Park, M. Kim, *2014 Asian Conference on Nanoscience and Nanotechnology*, Jeju, Korea, Oct 26-29, 2014
44. "Structural Rejuvenation of BMG Composites by High Pressure Torsion", **J.I. Lee**, H.S. Oh, E.S. Park, J.K. Lee and K. Tsuchiya, *BMG 10*, Shanghai, China, Jun 2014
45. "Fabrication of ceramic particulate Zr-based metallic glass matrix composites", **J.I. Lee**, E.S. Park, A. Wat, R.O. Ritchie, *the 10th international conference on bulk metallic glasses*, Shanghai university, China, Jun 1-5, 2014
46. "Mechanical properties of In-situ Formed ZrN Particulate Zr-based Bulk Metallic Glass Composites", **J.I. Lee**, E.S. Park and K. Tsuchiya, *TMS 2014*, San Diego, California, USA, Feb 2014
47. "Property evaluation of thermal and oxidation behavior in Al-rich Al-TM-MM metallic glasses", J.Y. Kim, M. Mansouri, **J.I. Lee**, E.S. Park, *2014 TMS*, San Diego, USA, Feb 16-20, 2014
48. "In-Situ Formation of Novel Al-AlN Composites by Gas-Melt Reaction", **J.I. Lee**, E.S. Park, *TMS 2013*, San Antonio, Texas, USA, Mar 03-07 2013
49. "Development of Zr-Based Bulk Metallic Glass Composites with In-Situ Formed ZrN Secondary Phases", **J.I. Lee**, E.S. Park, *TMS 2013*, San Antonio, Texas, USA, Mar 03-07 2013
50. "Preparation and mechanical properties of Zr-based bulk metallic glass composite reinforced with

dispersed nitride particles", **J.I. Lee** and E.S. Park, *IUMRS-ICA 2012*, Busan, Republic of Korea, Aug 26-33, 2012

51. "Synthesis of in-situ Al/AlN composite by gas-melt reaction at highly elevated temperature", **J.I. Lee**, H.K. Choi, **J.W. Kim** and E.S. Park, *IUMRS-ICA 2011*, Taiwan, Sep. 19-22, 2011 (**Poster Award**)
52. "Mg-rich Mg-Cu-Zn-Gd bulk metallic glass composites with enhanced plasticity", **J.I. Lee** and E.S. Park, *ICCM18*, Republic of Korea, Aug. 21-26, 2011
53. "(Icosahedral phase + α -Mg) two phase microstructures in the Mg-Zn-Gd ternary system", **J.I. Lee** and E.S. Park, *The 6th Asia Region International Workshop on Quasicrystals*, Republic of Korea, May 30 – Jun. 2, 2011 (**Young Scientist Award**)
54. "Improvement of deformability in Mg-rich metallic glass matrix composites", **J.I. Lee** and E.S. Park, *The 8th International Conference on Bulk Metallic Glasses*, Hong Kong, May 15-19, 2011
55. "Role of secondary phases for improved plasticity in Mg-based bulk metallic glass composites", **J.I. Lee** and **E.S. Park**, *TMS2011 Annual Meeting*, USA, Feb. 17 – Mar. 03, 2011
56. Effect of Secondary Phases on Enhanced Plasticity in Mg-based Bulk Metallic Glass Composites", **J.I. Lee** and **E.S. Park**, *2010 MRS Fall Meeting*, USA, Nov. 29 – Dec. 03, 2010
57. "Development of Mg-based BMG composites with high deformability", **J.I. Lee** and E.S. Park, *The 6th TU-UT-SNU Student Workshop*, Republic of Korea, Oct. 15-16, 2010
58. "Synthesis of Mg₆₅Cu₂₅Gd₁₀ metallic glass wire by homogeneous newtonian viscous flow", H.S. Oh, C.W. Ryu, **J.I. Lee** and **E.S. Park**, *IUMRS-ICA 2010*, China, Sep. 25-28, 2010 (**Poster Award**)
59. "A new parameter for evaluating glass-forming ability of metallic glasses", **J.I. Lee** and **E.S. Park**, *The 7th Pacific Rim International Conference on Advanced Materials and Processing*, Materials Australia, Australia, Aug. 02-06, 2010
60. "Microstructural manipulation for improved plasticity in Mg-Based bulk metallic glass composites", **J.I. Lee** and E.S. Park, *ISMANAM 2010*, Switzerland, Jul. 04-09, 2010
61. "A novel approach for estimation of glass-forming ability on metallic glass-forming alloys", **J.I. Lee** and **E.S. Park**, *International Conference on Mechanical Properties of Materials*, Zhejiang University, China, May 24-28, 2010

Domestic Conferences

1. "Development of bioinspired metal-ceramic composites using metallic glass", **J.I. Lee**, 2021 KSCM Spring meeting, Daejeon, Jun 24-25 2021. (**Invited**)
2. "Development of bioinspired metallic glass-ceramic composite materials via pressureless infiltration", **J.I. Lee**, 2021 KIM Spring meeting, Hoengseong, Apr 28-30 2021. (**Invited**)
3. "Effect of Co/Ni ratio on the microstructure and mechanical properties of CrMnFeCoNi alloys", **J.I. Lee**, H.S. Oh, E.S. Park, K. Tsuchiya, 2020 KMRS Fall meeting, Jeju, Nov 18-20 2020. (**Invited**)
4. "CrMnFeCoNi high-entropy shape memory alloys with fcc-hcp phase transformation", **J.I. Lee**, W.H. Ryu, H.S. Oh, E.S. Park, K. Tsuchiya, 2020 KIM Fall meeting, Daejeon, Oct 28-30 2020. (**Invited**)
5. "Bio-inspired metallic glass-alumina hybrid materials via pressureless infiltration", **J.I. Lee**, 2019 KMRS Fall meeting, Samcheok, Oct 30-Nov 01 2019. (**Invited**)
6. "Development of CrMnFeCoNi high-entropy alloys with shape memory effect", **J.I. Lee**, W. Tasaki, H.S. Oh, E.S. Park, K. Tsuchiya, 2019 KIM Fall meeting, Daegu, Oct 23-25 2019. (**Invited**)
7. "Abnormal mechanical response of HPTed Ti-Zr-Ni quasicrystal", **G.H. Yoo**, **J.I. Lee**, K. Tsuchiya, E.S. Park, 2018 KIM Fall meeting, Daejeon, Republic of Korea, Oct 24-26 2018.
8. "Effect of Al addition on deformation behavior of FCC HEAs", **K.N. Yoon**, H.S. Oh, **J.I. Lee**, E.S. Park, *2018 KIM Spring Meeting*, Jeju, Republic of Korea, Apr 25-27 2018.
9. "Investigation on phase separation behavior of High entropy alloy(HEA)s", **K.N. Yoon**, **J.I. Lee**, J.Y. Kim, E.S. Park, *2018 KIM Spring Meeting*, Jeju, Republic of Korea, Apr 25-27 2018.
10. "3D analysis on phase separation behavior of complex concentrated alloys", **K.N. Yoon**, **J.I. Lee**, K.Yaqoob, E.S. Park, The 29th Synchrotron Radiation Users' Workshop & KOSUA Meeting, POSTECH, Republic of Korea, Nov 23-24 2017.
11. "Development of light-weight TRIP FeMnCoCrAl high entropy alloy", **K.N. Yoon**, H.S. Oh, **J.I. Lee**, E.S. Park, 2017 KIM spring meeting, Changwon Republic of Korea, Apr 26-28 2017.
12. "3-D microstructure analysis of high entropy alloy foams", **K.N. Yoon**, **C.W. Ryu**, **J.I. Lee**, J.Y. Kim, K. Yaqoob, S.H. Kim, E.S. Park, *The 28th Synchrotron Radiation Users' Workshop & KOSUA Meeting*, POSTECH, Republic of Korea, Dec 9 2016
13. "In-situ formation of aluminum matrix composite with high volume fraction of aluminum nitride by arc melting method", **J.I. Lee**, E.S. Park, *2016 KIM Fall Meeting*, Busan, Republic of Korea, Oct

26-28 2016

14. "Manipulation of σ_y/κ ratio in single phase FCC solid-solutions with consideration of configurational entropy of mixing", J.I. Lee, H.S. Oh, E.S. Park, 2016 KIM Fall Meeting, Busan, Republic of Korea, Oct 26-28 2016 (**Poster Award**)
15. "Thermal and mechanical analysis on porous high entropy alloy", K.N. Yoon, J.I. Lee, J.Y. Kim, K. Yaqoob, S.H. Kim, E.S. Park, 2016 KIM Fall Meeting, Busan, Republic of Korea, Oct. 26-28 2016 (**Oral Presentation Award**)
16. "3D microstructure analysis of high entropy alloy foams", K.N. Yoon, J.I. Lee, J.Y. Kim, K. Yaqoob, S.H. Kim, E.S. Park, 2016 KIM Fall Meeting, Busan, Republic of Korea, Oct. 26-28 2016 (**Poster Award**)
17. "Phase separation behavior of high entropy alloy", K.N. Yoon, J.I. Lee, J.Y. Kim, K. Yaqoob, E.S. Park, 2016 KIM Spring Meeting, Gyeongju, Republic of Korea, Apr 27-29 2016 (**Oral Presentation Award**)
18. "Synthesis of porous metal by liquid metal dealloying process", K.N. Yoon, J.I. Lee, E.S. Park, 2016 KIM Spring Meeting, Gyeongju, Republic of Korea, Apr 27-29 2016
19. "Investigation of mechanical properties depending on VEC in W-based multicomponent alloy", I.H. Kim, J.I. Lee, E.S. Park, 2016 KIM Spring Meeting, Gyeongju, Republic of Korea, Apr 27-29 2016 (**Poster Award**)
20. "Alloy design strategy of high entropy alloys for cryogenic applications", J.I. Lee, H.S. Oh, E.S. Park, 2016 KIM Spring Meeting, Gyeongju, Republic of Korea, Apr 27-29 2016
21. "Nitridation mechanism in Al-AlN composites produced by gas-melt reaction", J.I. Lee, E.S. Park, 2016 KIM Spring Meeting, Gyeongju, Republic of Korea, Apr 27-29 2016
22. "Development of Al-AlN heat-sink materials via arc-plasma melting", J.I. Lee and E.S. Park, 2015 KIM Fall Meeting, Daejeon, Republic of Korea, Oct 28-30 2015
23. "Microstructure and mechanical properties of bio-inspired BMG composites", J.I. Lee, E.S. Park, A. Wat, R. O. Ritchie, 2015 KIM fall Meeting, Daejeon, Republic of Korea, Oct 28-30 2015
24. "Characterization of mechanical properties of bulk metallic glass composites after high pressure torsion", J.I. Lee, H.S. Oh, E.S. Park, J.K. Lee and K. Tsuchiya, 2015 KIM Fall Meeting, Daejeon, Republic of Korea, Oct 28-30 2015
25. "Investigation of relationship between changing entropy and properties in W-based solid solution", I.H. Kim, J.I. Lee, H.S. Oh, E.S. Park, 2015 KIM fall Meeting, Daejeon, Republic of Korea, Oct 28-30 2015 (**Oral Presentation Award**)
26. "Investigation of hardening mechanism by variation of entropy in W-Ta complete solid solution", I.H. Kim, J.I. Lee, H.S. Oh, E.S. Park, D.H. Kang, G.W. Lee, 2015 KIM fall Meeting, Daejeon, Republic of Korea, Oct 28-30 2015
27. "Thermophysical property analysis of solid solution alloys depending on mixing enthalpy variation", C.W. Ryu, J.I. Lee, H.S. Oh, E.S. Park, J. Brillo, A. Meyer, 2015 KIM fall Meeting, Daejeon, Republic of Korea, Oct 28-30 2015
28. "Fabrication of metallic foam by liquid metal dealloying process", K.N. Yoon, J.I. Lee, E.S. Park, 2015 KIM fall Meeting, Daejeon, Republic of Korea, Oct 28-30 2015
29. "Development of Novel Tungsten Based Alloys with High Entropy Effect for Fusion Reactor", I.H. Kim, H.S. Oh, J.I. Lee and E.S. Park, 2015 KIM Spring Meeting, Changwon, Republic of Korea, Apr 22-24 2015
30. "Manipulation of Al-based metallic glasses with wide super-cooled liquid region by controlling configurational entropy of solute elements", W. Kim, J.I. Lee and E.S. Park, 2015 KIM Spring Meeting, Changwon, Republic of Korea, Apr 22-24 2015 (**Poster Award**)
31. "Effect of severe plastic deformation of Al-AlN composites", J.I. Lee, E.S. Park and K. Tsuchiya, 2015 KIM Spring Meeting, Changwon, Republic of Korea, Apr 22-24 2015
32. "Development of Al matrix composites with in-situ formed high volume fraction of nitride particles", J.I. Lee and E.S. Park, 2015 KIM Spring Meeting, Changwon, Republic of Korea, Apr 22-24 2015
33. "Properties change of BMG matrix composites deformed by HPT process", J.I. Lee, H.S. Oh, E.S. Park, J.K. Lee and K. Tsuchiya, 2014 KIM Fall Meeting, Jeongseon, Republic of Korea, Oct 22-24 2014
34. "Investigation of Mg based bulk metallic glass composite with quasi-crystalline secondary phase", W. Kim, J.I. Lee, H.S. Oh and E.S. Park, 2014 KIM Fall Meeting, Jeongseon, Republic of Korea, Oct 22-24 2014
35. "Development of rollable in-situ Al/AlN composite for thermal management application" J.I. Lee,

- E.S. Park, and K.Tsuchiya, 2014 KIM Spring Meeting, Apr 24-25 2014
36. "Rejuvenation of bulk metallic glass composites by high pressure torsion" **J.I. Lee**, H.S. Oh, E.S. Park, J.K. Lee, and K.Tsuchiya, 2014 KIM Spring Meeting, Daegu, Republic of Korea, Apr 24-25 2014 (**Poster Award**)
 37. "Investigation of phase stability of high entropy alloy about high pressure torsion" **H.S. Oh**, **J.I. Lee**, T. Koichi, and E.S. Park, 2014 KIM Spring Meeting, Daegu, Republic of Korea, Apr 24-25 2014 (**Poster Award**)
 38. "Development of Mg-based metallic glass composite with 2nd quasi-crystalline I-phase" **W. Kim**, **J.I. Lee**, H.S. Oh, and E.S. Park, 2014 KIM Spring Meeting, Daegu, Republic of Korea, Apr 24-25 2014
 39. "Alloy design and manufacture of in-situ Al/AlN composite with superior thermal properties", **J.I. Lee**, E.S. Park, and Koichi Tsuchiya, 2013 KIM Fall Meeting, Gwangju, Republic of Korea, Oct 24-25 2013
 40. "Development of in-situ Zr BMG/ZrN composite through nitride transformation", **J.I. Lee**, S.W. Son, and E.S. Park, 2013 KIM Spring Meeting, Jeju, Republic of Korea, Apr 25-26 2013
 41. "Controlling thermal properties of Al-X/AlN in-situ composite formed by gas-melt reaction", **J.I. Lee**, H.S. Oh, and E.S. Park, 2013 KIM Spring Meeting, Jeju, Republic of Korea, Apr 25-26 2013
 42. "Thermal properties of in-situ Al/AlN composite by gas-melt reaction", **J.I. Lee** and E.S. Park, 2012 KIM Fall Meeting, Republic of Korea, Oct. 25-26, 2012
 43. "Development of Zr-Based bulk metallic glass composite reinforced with in-situ formed ZrN particles", **J.I. Lee** and E.S. Park, 2012 KIM Fall Meeting, Republic of Korea, Oct. 25-26, 2012 (**Poster Award**)
 44. "Synthesis and mechanical properties of Zr-Al-Ni-Cu bulk metallic glass composite containing ZrN particles", **J.I. Lee** and E.S. Park, *The 8th TU-UT-SNU-TJU Student Workshop*, Tianjin, China, Oct 17-20, 2012
 45. "Development of AlN-rich/Al matrix Composite by controlled in-situ Gas-melt Reaction", **J.I. Lee**, J.S. Kyeong and E.S. Park, 2012 KIM Spring Meeting, Republic of Korea, Apr. 26-27, 2012
 46. "Synthesis of Al/AlN composite by in-situ gas-melt reaction with improved thermal properties", **J.I. Lee** and E.S. Park, 2011 KIM Fall Meeting, DCC, Daejeon, Republic of Korea, Oct. 27-28, 2011
 47. "In-situ aluminum matrix composite reinforced with AlN by activated gas-melt reaction", **J.I. Lee** and E.S. Park, *The 7th TU-SNU-UT Student Workshop*, Japan, Oct 19-22, 2011
 48. "Fabrication of in-situ Al/AlN composite by gas-melt reaction", **J.I. Lee** and **E.S. Park**, 2011 KIM Spring Meeting, EXCO, Daegu, Republic of Korea, Apr. 21-22, 2011
 49. "Improvement of plasticity in Mg-rich Mg-Cu-Zn-Gd bulk metallic glasses composites", **J.I. Lee** and E.S. Park, 2011 KIM Spring Meeting, EXCO, Daegu, Republic of Korea, Apr. 21-22, 2011
 50. "Fabrication of Mg-based metallic glass wire by newtonian viscous flow in supercooled liquid region", **C.W. Ryu**, H.S. Oh, **J.I. Lee** and E.S. Park, 2011 KIM Spring Meeting, EXCO, Daegu, Republic of Korea, Apr. 21-22, 2011 (**Poster Award**)
 51. "Effect of secondary phase for improved plasticity in Mg-based bulk metallic glass composites", **J.I. Lee** and E.S. Park, 2010 KIM Fall Meeting, CECC, Changwon, Republic of Korea, Nov, 2010
 52. "Synthesis of Mg-based metallic glass wire by homogeneous viscous flow", **C.W. Ryu**, H.S. Oh, **J.I. Lee** and E.S. Park, *Korean Institute of Metals and Materials 2010 Fall Meeting*, CECC, Changwon, Republic of Korea, Nov. 04-05, 2010 (**Poster Award**)
 53. "Enhancement of plasticity in Mg-rich Mg-Cu-Gd bulk metallic glass composite", **J.I. Lee** and E.S. Park, 2010 KIM Spring Meeting, Hyundai Sungwoo Resort, Hoengseong, Republic of Korea, Apr. 22-23, 2010

(4) Research project contributed

Government funding

1. PI: **J.I. Lee**, GOAL: Development of high-temperature high-entropy shape memory alloys for actuator applications, Ministry of Science and ICT, Mar 01 2021 – Feb 28 2025
2. PI: **J.I. Lee**, GOAL: Development of aluminum-aluminum nitride composites through in situ reaction assisted by catalytic elements, Ministry of Science and ICT, Sep 01 2020 – Aug 31 2021
3. PI: **J.I. Lee**, GOAL: Post-processing of titanium alloy powder for additive manufacturing of power generation parts, Ministry of Trade, Industry and Energy, Aug 01 2020 – Dec 31 2023

4. PI: **J.I. Lee**, GOAL: Microstructural design of solid-solution strengthening Ni-based superalloys for improved creep-resistance in steam environments, Ministry of Trade, Industry and Energy, Apr 01 2020 – Dec 31 2024
5. PI: E.S. Park, GOAL: Development of novel W alloys for plasma facing materials of diverter module in fusion reactor, Ministry of Science, ICT & Future Planning, Jun 30 2014 – May 31 2017
6. PI: E.S. Park, GOAL: Metal matrix composite by gas reaction control, Ministry of Knowledge Economy, Jun 1 2010 – May 31 2014
7. PI: E.S. Park, GOAL: Synthesis of metallic glass nanowire, Ministry of Education, Science and Technology, Undergraduate research program, Mar 1 2010 – Feb 28 2011
8. PI: E.S. Park, GOAL: Development of Mg-rich amorphous metal plate with exceptional magnetic property and sustainable ductility, Ministry of Education, Science and Technology, May 1 2009 – Apr 30 2012
9. PI: E.S. Park, GOAL: Interface microstructure analysis of ceramic coating layer prepared by aerosol deposition method, Ministry of Knowledge Economy, Dec 23 2008 – Feb 29 2012

Industry funding

1. PI: D.I. Kwon, Co-PI: E.S. Park, GOAL: Research center for functional composite materials_ Development of high entropy alloys for structural application at cryogenic temperature, POSCO, Dec 16 2015 – Dec 15 2016
2. PI: E.S. Park, GOAL: Development of novel metallic glass coatings for exterior materials of mobile devices, LG electronics, Apr 1 2014 – Oct 31 2014
3. PI: D.I. Kwon, Co-PI: E.S. Park, GOAL: Research center for functional composite materials, POSCO, Dec 15 2013 – Dec 31 2014

3. Activity

1. Voluntary service, Jusarang Community church with the baby box, Korea, 2012 – 2016
2. SNU Mentor to undergraduate student, SNU, Sep. 2015 – Feb. 2016
3. Teaching assistant at Dept. of Materials Science and Engineering, SNU, Sep. 2011 – Aug. 2013
4. SNU Mentor to undergraduate student, SNU, Nov. 2009 – Oct. 2011
5. Physics tutor at the College of Engineering, SNU, Mar. 2009 – Aug. 2009
6. Representative of the students of Dept. of Materials Science and Engineering, 2008

4. REFERENCES

1. **Eun Soo Park, Professor**
Department of Materials Science and Engineering, Seoul National University
1 Gwanak-ro, Gwanak-gu, Seoul 08826, Republic of Korea
TEL: +82-2-880-7221 / FAX: +82-2-883-8197
E-mail: espark@snu.ac.kr
2. **Koichi Tsuchiya, Director**
International Center for Young Scientist, National Institute for Materials Science
1-2-1 Sengen, Tsukuba, Ibaraki 305-0047, Japan
TEL: +81-29-859-2117 / FAX: +81-29-859-2101
E-mail: TSUCHIYA.koichi@nims.go.jp
3. **Robert O Ritchie, H.T. & Jessie Chua Distinguished Professor of Engineering**
Department of Materials Science & Engineering, University of California
Berkeley, CA 94720-1760, USA
TEL: +1-(510)-486-5798 / FAX: +1-(510)-643-5792
E-mail: roritche@lbl.gov