Kai Narita

484 E. California Blvd Apt 12, Pasadena, CA 91106 | +1-6264934038

knarita@caltech.edu | http://labusers.net/~knarita/

EDUCATION

California Institute of Technology (CA, USA) / Sep 2016 – Present

PhD candidate in Materials Science, GPA 3.50/4.00

Tokyo Institute of Technology (Tokyo, Japan) / Apr 2014 - Mar 2016

Master of Engineering in Metallurgy and Ceramics Science, GPA: 3.72/4.00

Tokyo Institute of Technology (Tokyo, Japan) / Apr 2010 - Mar 2014

Bachelor of Engineering in Metallurgical Engineering, GPA: 3.80/4.00 (the top grade)

Completion of Global Scientists and Engineers Course

Completion of Medical Engineering Course

RESEARCH EXPERIENCES

California Institute of Technology (CA, USA)/ Jan 2017 – Present

PhD study under Prof. Julia Greer

- Developed 3D architected carbon battery electrodes using lithography-based 3D printing and pyrolysis, which provide multidimensional form factors from micron to centimeter scales
- Analyzed microstructure of 3D architected carbon and its electrochemical performance as Li- and Na-ion batteries
- Developed catalytic graphitization of 3D architected carbon using nano-particles of transition metals incorporated by dissolving metal salts in curable resin and combustion synthesis during pyrolysis

Max Planck Institute for Solid State Research (Stuttgart, Germany)/ May 2019 – Oct 2019

Visiting researcher under Prof. Joachim Maier and Dr. Robert Usiskin

- Developed thin films of lithium oxide and lithium sulfide by radio frequency sputtering
- Characterized microstructure of air- and electron- sensitive thin films by SEM, TEM, EELS and SIMS
- Characterized transport properties of thin films of lithium oxide and lithium sulfide by electrochemical impedance spectroscopy with changing annealing conditions

Tokyo Institute of Technology (Tokyo, Japan)/ Oct 2012 - Aug 2016

Bachelor's and Master's Thesis Research, and research assistant under Prof. Equo Kobayashi

- Developed Mg/β-tricalcium phosphate (β-TCP) composites by ball milling and spark plasma sintering (SPS) for orthopedic biodegradable implants
- Elucidated effects of sintering behavior involving reactions on mechanical properties of Mg/β-TCP composites
- Elucidated effects of *in vitro* corrosion on mechanical integrity of Mg/β-TCP composites
- Improved mechanical properties of Mg/β-TCP composites before and after *in vitro* corrosion
- Developed porous Mg/β-TCP composites using urea as a space holder for scaffolds in orthopedic applications

University of Wisconsin-Madison (WI, USA)/ Sept - Oct 2015

Visiting Researcher, under Prof. Sindo Kou

- Investigated liquation cracking during metal inert gas (MIG) welding of Mg alloys

University of California, Riverside (CA, USA)/ Jul - Sept 2014

Visiting Researcher, under Prof. Huinan Liu

- Evaluated corrosion properties and cytocompatibility of Mg/β-TCP composites

National Institute for Material Science (NIMS) (Tsukuba, Japan)/ Mar 2014 (one month)

Internship, under Dr. Sachiko Hiromoto

- Investigated effects of sintering temperatures of SPS on corrosion properties of pure Mg

NIPPON STEEL & SUMITOMO METAL (Hokkaido, Japan)/ Aug 2012 (one month)

Internship

- Developed continuous cooling transformation (CCT) phase diagrams of alloyed steels

RESEARCH CAPABILITIES

Material fabrication:	Electroplating, Digital Light Processing (DLP) 3D printing, Sputtering, Spark plasma sintering (SPS), planetary ball milling
Microstructural evaluation:	Optical microscopy, laser microscopy, scanning electron microscopy (SEM), energy-dispersive X-ray spectroscopy (EDS), electron probe micro analysis (EPMA), Transmission Electron Microscopy (TEM), X-ray diffraction (XRD), Raman spectroscopy, Secondary-Ion Mass Spectroscopy (SIMS)
Mechanical evaluation:	Micro Vickers hardness test, compression test
Battery and corrosion evaluations:	Various electrochemical measurements
Biological evaluation	pH meter, cell culture, fluorescence microscopy
Thermal analysis:	Differential scanning calorimetry (DSC), differential thermal analysis (DTA), thermogravimetry (TG)
Computer:	Image J, SolidWorks, GIMP, Origin, Matlab, Microsoft Office

SCHOLARSHIPS & RESEARCH FUNDING

Masason Foundation/ July 2017 – June 2021

-Research funding:

2,795,228 JPY (≈ 25 thousands USD) in 2019.7 – 2020.6

2,281,899 JPY (≈ 20 thousands USD) in 2018.7 – 2019.6

1,830,000 JPY (≈ 16.5 thousands USD) in 2017.7 – 2018.6

-Full tuition and Allowance in 2019.7-2020.6

Takenaka Foundation Scholarship/ Sep 2016 - Aug 2019

-Tuition: 2.5 million JPY (≈ 20 thousands USD) per year

-Allowance: 2 million JPY (≈ 16 thousands USD) per year

Asahi Glass Scholarship Foundation/ Apr 2014- Mar 2016

Tokyo Institute of Technology International Education and Research Program/Sep - Oct 2015

Scholarship for study abroad program/ July- Sept 2014

AWARDS

Best Poster Award in the 12th Young Metallurgist Workshop/ Nov 2015

Best Poster Award in the Master Course Interim Poster Presentation/ Sept 2015

Grand Prize in EURAXESS Science Slam Japan 2014/ Nov 2014

Excellent Student Award for Outstanding Academic Achievement/ Mar 2014

Given to one student in each department from Tokyo Institute of Technology (undergraduate)

The Best Presentation Award for Bachelor's Thesis/ Mar 2014

Nittono Award/ Mar 2014

Given to one student who earned the most credits in three departments related to materials science from Tokyo Institute of Technology (undergraduate)

HONORS

Invited talk at the 63rd Japan Society of Applied Physics Spring Meeting 2016/ Mar 2016

Exchange program with Dalian Institute of Technology (Dalian, China) /Mar 2013 (one week)

Honor given to top 10% of department juniors

Special junior-year early admission to senior-year laboratory/ Oct 2012

Honor given to top 10% of department juniors

PUBLICATIONS & PATENTS

1. Inventors: J. R. Greer, A. Vyatskikh, J. S. Thorne, A. Kudo, K. Narita, M. A. Citrin, X. Zhang; Three-Dimensional Architected Pyrolyzed Electrodes for Use in Secondary Batteries and Methods of Making Three-Dimensional Architected Electrodes/ patent applied
2. K. Narita, H. Yang, M. Citrin, X. Xia, J. R. Greer; 3D-Architected Carbon Electrodes for Energy Storage/ in preparation
3. K. Narita, S. Hiromoto, E. Kobayashi, T. Sato; Degradation and mechanical integrity of magnesium-matrix composites utilizing reaction with β-tricalcium phosphate during sintering/ in preparation
4. K. Narita, Q. Tian, I. Johnson, C. Zhang, E. Kobayashi, H. Liu; Degradation behaviors and cytocompatibility of Mg/β-tricalcium phosphate composites produced by spark plasma sintering, *Journal of Biomedical Materials Research Part B: Applied Biomaterials* **2019**
5. N. Q. Cao, D. N. Pham, K. Narita, H. V. Dinh, S. Hiromoto, E. Kobayashi; In Vitro Corrosion Properties of Mg Matrix In Situ Composites Fabricated by Spark Plasma Sintering, *Metals* **2017**; 7 (9), 358
6. K. Narita, E. Kobayashi, T. Sato; Sintering behavior and mechanical properties of Mg/β-tricalcium phosphate composites sintered by spark plasma sintering, *Materials Transaction* **2016**; 57; 1620-7
7. N. Cao, K. Narita, E. Kobayashi, T. Sato; Evolution of the microstructure and mechanical properties of Mg-matrix *in situ* composites during spark plasma sintering, *Powder Metallurgy* **2016;**1–6
8. K. Narita, E. Kobayashi, T. Sato; Mechanical Properties Before and After in Vitro Corrosion for Mg/β-TCP Composites Fabricated by Spark Plasma Sintering, *Proceedings of 24th International Symposium on Processing and Fabrication of Advanced Materials (peer-reviewed)* **2015**, p. 69-78
9. K. Narita, E. Kobayashi, T. Sato; Microstructure, Initial Strength and Mechanical Integrity of Mg/β-TCP Composites Fabricated by Spark Plasma Sintering, *Proceedings of the Biomaterials International Conference 2015 (peer-reviewed)* **2015** (digital media)
10. K. Narita, S. Suzuki, T. Kuno; Creativity Laboratory in Metallurgy –Making Fuel Cell–, *Proceedings of AOTULE 2012 7th Student Conference* **2012,** p. 40

CONFERENCES / COMPETITION

1. **226th Electrochemical Society meeting**
   (Atlanta, US)/ Oct 2019
   Poster: 3D architected pyrolytic carbon electrodes with multi-scale controlling factors
2. **Materials Research Society Fall meeting**
   (Boston, US)/ Nov 2018
   Oral: 3D Architected Pyrolytic Carbon as Efficient Battery Electrode
3. **9th Pacific Rim International Conference on Advanced Materials and Processing**
   (Kyoto, Japan)/ Aug 2016
   Co-author: Effect of β-TCP Size and Porosity on Mechanical Properties of Ti-6Al-4V/β-TCP Composites for Biomedical Applications
4. **The 63rd Japan Society of Applied Physics Spring Meeting 2016**

(Tokyo, Japan)/ Mar 2016

Invited talk: Pursue my dream as a researcher —choice of PhD in a western country—

5. **24th International Symposium on Processing and Fabrication of Advanced Materials**

(Osaka, Japan)/ Dec 2015

Oral: Mechanical Properties Before and After *in Vitro* Corrosion for Mg/β-TCP Composites Fabricated by Spark Plasma Sintering

6. **The 129th Conference of Japan Institute of Light Metals**

(Tokyo, Japan)/ Nov 2015

Co-author: Effect of Preparation of β-TCP on Mechanical Properties of Ti-6Al-4V/β-TCP Composites for Biomedical Application Before and After Dissolution of β-TCP

7. **The 12th Young Metallurgist Meeting**

(Kanagawa, Japan)/ Nov 2015

Poster: Microstructure and Strength Change due to Corrosion of Mg/Calcium Phosphates Composites (Best Presentation Award)

8. **Biomaterials International 2015**

(Kenting, Taiwan)/ June 2015

Oral: Microstructure, Initial Strength and Mechanical Integrity of Mg/β-TCP Composites Fabricated by Spark Plasma Sintering

9. **EURAXESS Science Slam Japan 2014**

(Tokyo, Japan)/ Nov 2014

-Competition of science communication skills

Oral: Na-rry Potter and Mg (Grand Prize)

10. **The 127th Conference of Japan Institute of Light Metals**

(Tokyo, Japan)/ Nov 2014

Oral: Microstructure and Mechanical Properties of Mg/β-TCP Composites Fabricated by Spark Plasma Sintering

11. **Asia-Ocean Top University League on Engineering (AOTULE) 2012 7th Student Conference**

(Kuala Lumpur, Malaysia)/ Nov 2012

Oral: Creativity Laboratory in Metallurgy -Making Fuel Cell-

EXTRACURRICULAR ACTIVITIES

Summer Camp for K-12 students in the Masason foundation / August 2019

- Organized 3-days Summer Camp conducted at Caltech, UCLA and JPL

Science communication workshop by EURAXESS (Bonn, Germany)/ June 2015

- Learned and discussed science communication methods with EURAXESS Science Slam 2014 winners

Science Communication for Global Talents -Overseas Internship- (London, UK)/ Sep 2013

- Conducted research at science-related institutes in London (Royal Institution, Science Museum, etc.)

The Royal Institution Christmas Lectures (Tokyo, Japan)/ Aug 2013

- Facilitated performances by Professor Peter Wothers as a volunteer staff