

Claire Kuo

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Education

PhD Candidate – Materials Science

California Institute of Technology

- GPA: 3.8/4.0

- Advisor: Katherine Faber

2015 – Expected: Nov. 2020

Bachelor of Science – Materials Science and Engineering

National Tsing Hua University (NTHU), Taiwan

- Overall GPA: 4.28/4.30

- Ranking: 1st in a class of 109

2011 – 2015

Professional Experience

Graduate Research Assistant, California Institute of Technology

Sept. 2015 – Present

- Develop processes to reinforce freeze-cast ceramics with carbon nanotubes and silicon carbide whiskers.
- Design *in-situ* phase separated freezing experiment to assess whisker engulfment versus rejection.
- Model particle engulfment of high-aspect-ratio particles by freezing solvents; used MATLAB code to produce freezing simulation from proposed model
- Combine multi-scale pore-forming strategies to create hierarchical porous solids in collaboration with Air Force Research Laboratory
- Serve as the safety officer in charge of Faber lab safety procedures and training

Teaching Assistant, California Institute of Technology

Fall 2017, Spring 2019

- Courses: Fundamentals of Materials Science, Kinetic Processes in Materials
- Evaluated students' homework and lab reports
- Conducted tutorial sessions and lab demonstrations

Awards

National Tsing Hua University Academic Achievement Awards

Zhu Shun Yi He Qin Scholarship

Extraordinary Engineering Student Scholarship from Chinese Institute of Engineers, Taiwan

Publications

Kuo, C.T. & Faber, K.T. (2020). Permeable carbon nanotube-reinforced silicon oxycarbide via freeze casting with enhanced mechanical stability. *Journal of the European Ceramic Society*, 40(6), 2470–2479. doi: 10.1016/j.jeurceramsoc.2019.12.059

Kuo, C.T. & Faber, K.T. Mechanically-enhanced porous silicon oxycarbide through particle engulfment of high-aspect ratio particles in freeze casting. Manuscript in preparation.

Kuo, C.T., Rueschhoff, L.M., Dickerson, M.B. and Faber, K.T. Hierarchical pore structures via freeze casting with preceramic polymers and block copolymers. Manuscript in preparation.

Presentations

Invited talk, Friedrich-Alexander-Universität Erlangen-Nürnberg, Germany (2017) – Silicon oxycarbide composites via freeze casting with preceramic polymers

Invited talk, Università di Padova, Italy (2017) – Silicon oxycarbide composites via freeze casting with preceramic polymers

42nd International Conference and Exposition on Advanced Ceramics and Composites (2018) – Multiwall carbon nanotube-silicon oxycarbide composite via freeze-casting with preceramic polymers

43rd International Conference and Exposition on Advanced Ceramics and Composites (2019) – Aligning and engulfment of high-aspect-ratio fillers in freeze casting

44th International Conference and Exposition on Advanced Ceramics and Composites (2020) – Hierarchical pore structures via freeze casting with preceramic polymers and block copolymers

44th International Conference and Exposition on Advanced Ceramics and Composites (2020) – Theoretical and experimental investigations of particle engulfment of high-aspect ratio particles in freeze casting

Skills

Material characterization

- Scanning electron microscopy (SEM)
- Mercury intrusion porosimetry (MIP)
- Instron universal testing machine for mechanical testing
- Transmission electron microscopy (TEM)
- Nitrogen adsorption porosimetry
- Vickers Hardness Testing
- X-ray Diffraction (XRD)

Ceramics

- Design and construction of ice-templating systems to fabricate porous ceramic composites with ceramic powders and preceramic polymers
- Material characterizations of structures, elementary analysis, pore size distribution, surface area, and mechanical properties.
- Fracture analysis of brittle materials

Software

- MATLAB
- Mathematica

Leadership Experience

President of the volunteer group at NTHU counseling center

2014 – 2015

- Volunteered at the counseling center at NTHU for four years
- Served as the team leader of the student event team and ran a campus-wide event, attracting six times more participants (100+ participants) than the previous semesters.
- Elected as the vice president and the president in two different years and managed four teams in the group