

Curriculum Vitae

(as of 12/2019)

Yixiu Luo, Ph.D

Assistant Professor

Advanced Ceramics and Composites Division, Shenyang National Laboratory for Materials Science, Institute of Metal Research, Chinese Academy of Sciences

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RESEARCH INTERESTS

- Computational simulation for materials design
- Modeling of material properties for energy conversion applications, i.e. thermoelectrics, thermal/environmental barrier coatings (TEBC), nuclear reactors, *etc.*
- Thermal transport in solids and methodology development

EDUCATION

09/2013 - 06/2019

Ph.D in Materials Science and Engineering

¹School of Materials Science and Engineering, University of Science and Technology of China (USTC)

²Institute of Metal Research, Chinese Academy of Sciences (IMR, CAS), Shenyang 110016, China

Dissertation Title: "Theoretical investigation and phonon engineering on thermal properties of rare-earth silicates"

Advisor: Prof. Jingyang Wang

09/2009 - 07/2013

B.S. in Physics

Liaoning University, Shenyang 110036, China

Thesis Title: "First-principles investigations of crystal structural and physical properties of γ -Y₂Si₂O₇"

Thesis Advisor: Prof. Chenghua Zhang & Prof. Jingyang Wang

VISITING EXPERIENCE

01/2018 - 02/2019

Visiting scholar at School of Mechanical Engineering, Purdue University, West Lafayette, IN 47906, USA

Project: Phonon transport in low-thermal-conductivity materials

Advisor: Prof. Xiulin Ruan

RESEARCH EXPERIENCE

01/2018 - 02/2019

Nanoscale Energy Transport and Conversion Laboratory, School of Mechanical Engineering, Purdue University

- Modeling of phonon transport in complex-structure materials (pyrochlores, perovskites, skutterudites, *etc.*) using first-principles and molecular dynamics (MD) methods
- Methodology development for thermal transport in complex-structure materials

09/2013 - 06/2019

School of Materials Science and Engineering, USTC; High-performance Ceramics Division, IMR, CAS

- First-principles modeling on crystal structure, electronic, elastic and thermal properties of high-performance oxide ceramics, e.g. rare-earth silicates, for application as thermal/environmental barrier coatings (TEBC)
- First-principles modeling on phonon behaviors and thermal transport in oxide ceramics
- Material-genome design for TEBC materials with tailored thermal properties
- Synthesis of rare-earth silicates and solid-solutions
- Rietveld refinement of X-ray diffraction data for crystallines

08/2010 - 07/2013

Department of Physics, Liaoning University

- Synthesis of TiO₂ mesoporous nanomaterials for photocatalytic applications under visible-light irradiation

HONORS AND AWARDS

- Merit Student of USTC (06/2018)
- First-prize "Shi Chang-Xu" Award, IMR, CAS (03/2016)
- National Scholarship for PhD Student (12/2015)
- Merit Student of CAS (06/2015)
- Scholarship for Outstanding Academic Record, IMR, CAS (09/2014)
- National Scholarship for Undergraduate Student (12/2012)
- Excellent Student, Liaoning University (2009-2013)
- 2nd Prize in "Challenge Cup for Science & Technology Inventions" of Liaoning Province (07/2011)

PUBLICATIONS

1. Y. X. Luo, L. C. Sun, J. M. Wang, Z. Wu, X. R. Lv, J. Y. Wang, Material-genome perspective towards tunable thermal expansion of rare-earth di-silicates, *J. Eur. Ceram. Soc.* 38 (2018) 3547-3554
2. Y. X. Luo, L. C. Sun, J. M. Wang, Z. L. Tian, H. Q. Nian, J. Y. Wang, Tunable thermal properties in yttrium silicates switched by anharmonicity of low-frequency phonons, *J. Eur. Ceram. Soc.* 38 (2018) 2043-2052
3. Y. X. Luo, J. M. Wang, Y. R. Li, J. Y. Wang, Giant phonon anharmonicity and anomalous pressure dependence of lattice thermal conductivity in Y₂Si₂O₇ silicate, *Sci. Rep.* 6 (2016) 29801
4. Y. X. Luo, J. M. Wang, J. N. Li, Z. J. Hu, J. Y. Wang, Theoretical study on crystal structures, elastic stiffness, and intrinsic thermal conductivities of β -, γ -, and δ -Y₂Si₂O₇, *J. Mater. Res.* 30 (2015) 493-502
5. Y. X. Luo, J. M. Wang, J. Y. Wang, J. N. Li, Z. J. Hu, Theoretical predictions on elastic stiffness and intrinsic thermal conductivities of yttrium silicates, *J. Am. Ceram. Soc.* 97 (2014) 945-951
6. Y. R. Li, Y. X. Luo, Z. L. Tian, J. M. Wang, J. Y. Wang, Theoretical exploration of the abnormal trend in lattice thermal conductivity for monosilicates RE₂SiO₅ (RE = Dy, Ho, Er, Tm, Yb and Lu), *J. Eur. Ceram. Soc.* 38 (2018) 3539-3546
7. Z. Wu, W. P. Hu, Y. X. Luo, L. C. Sun, J. Y. Wang, Porous γ -(Y_{1-x}Ho_x)₂Si₂O₇ thermal insulator with excellent high-temperature strength retention and very low thermal conductivity, *J. Eur. Ceram. Soc.* 38 (2018) 3347-3353
8. Y. R. Li, Z. L. Tian, Y. X. Luo, J. M. Wang, L. C. Sun, L. Y. Zheng, J. Y. Wang, Pressure-induced low-lying phonon modes softening and enhanced thermal resistance in β -Mg₂Al₄Si₅O₁₈, *Phys. Rev. B* 95 (2017) 054301
9. P. Wan, Z. L. Tian, Y. X. Luo, B. Liu, J. Y. Wang, Accurate exploration of the intrinsic lattice thermal conductivity of Si₂N₂O by combined theoretical and experimental investigations, *J. Am. Ceram. Soc.* 99 (2016) 988-995

CONFERENCE AND PRESENTATIONS

1. Y. X. Luo, X. L. Yang, J. Y. Wang, X. L. Ruan, “Reliable prediction of lattice thermal conductivity of $\text{La}_2\text{Zr}_2\text{O}_7$ TBC material using modified two-channel model”, presented on 43st International Conference & Exposition on Advanced Ceramics and Composites (ICACC’19), Daytona Beach, Florida, US, 01/27/2019-02/01/2019 (Contributed, oral)
2. Y. X. Luo, J. Y. Wang, “Tailoring phonon anharmonicity and its impacts on thermal properties of yttrium silicates”, presented on 41st International Conference & Exposition on Advanced Ceramics and Composites (ICACC’17), Daytona Beach, Florida, US, 01/22/2017-01/27/2017 (Contributed, oral)
3. Y. X. Luo, J. Y. Wang, “Tailoring phonon behaviors in Y-Si-O silicates”, presented at 11th International Conference on Ceramic Materials and Components for Energy and Environmental Applications (CMCEE), Vancouver, Canada, 06/14/2015-06/19/2015 (Contributed, oral)