

# FEI Hongzhan

费宏展

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## WORKING EXPERIENCES

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- **2015.10-present:** postdoctoral researcher. Bayerisches Geoinstitut, University of Bayreuth, Germany.
- **2013.11-2015.09:** JSPS postdoctoral fellow. Inst. for Study of the Earth Interior. Okayama University. Japan.

## EDUCATION

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- **2010.04–2013.11:** PhD. Bayerisches Geoinstitut. University of Bayreuth. Germany.  
Thesis: Silicon and oxygen self-diffusion in forsterite and implications to upper-mantle rheology.
- **2009.04–2010.03:** PhD. candidate. Institute for Study of the Earth's Interior. Okayama University. Japan.  
Topic: Silicon and oxygen self-diffusion in mantle minerals.
- **2004.09–2008.06:** BSc. in geology. Department of Earth Sciences. Zhejiang University. China.

## RESEARCH INTERESTS

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- Defects chemistry, atomic diffusion, and dislocation in minerals.
- Diffusion and dislocation creep in minerals.
- Mineral physics, mantle rheology, geodynamics.
- Water in nominally anhydrous minerals.
- Synthesis of large single crystals of mantle minerals.
- Electrical conductivity of minerals and melts.

## AWARDS

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- Kulturpreis Bayern (Culture prize in Bavaria State, Germany. 2014).
- JSPS postdoctoral fellowship (Japan Society for the Promotion of Science, 2013-2015).
- Excellent bachelor thesis (Zhejiang University, China. 2008).

## RESEARCH ACTIVITIES

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### ➤ Peer reviewed papers:

1. **H. Fei**, S. Koizumi, N. Sakamoto, M. Hashiguchi, H. Yurimoto, K. Marquardt, N. Miyajima, T. Katsura (2018). Mg lattice diffusion in iron-free olivine and implications to conductivity anomaly in the oceanic asthenosphere. *Earth and Planetary Science Letters*, 484, 204-212.
2. **H. Fei**, M. Wiedenbeck, N. Sakamoto, H. Yurimoto, T. Yoshino, D. Yamazaki, T. Katsura (2018). Negative activation volume of oxygen self-diffusion in forsterite. *Physics of the Earth and Planetary Interiors* 275, 1-8.
3. Z. Liu, M. Nishi, T. Ishii, **H. Fei**, N. Miyajima, T. Boffa-Ballaran, H. Ohfuji, T. Sakai, L. Wang, S. Shcheka, T. Arimoto, Y. Tange, Y. Higo, T. Irifune, T. Katsura (2017). Phase relations in the system MgSiO<sub>3</sub>-Al<sub>2</sub>O<sub>3</sub> up to 2300 K at lower-mantle pressures. *Journal of Geophysical Research: Solid Earth* 122, 7775-7788. Doi: 10.1002/2017JB014579.
4. **H. Fei**, R. Huang, X. Yang (2017). CaSiO<sub>3</sub>-perovskite may cause electrical conductivity jump in the topmost lower mantle. *Geophysical Research Letters* 44, 10226-10232. doi: 10.1002/2017GL075070.
5. **H. Fei**, D. Yamazaki, M. Sakurai, N. Miyajima, H. Ohfuji, T. Katsura, T. Yamamoto (2017). A nearly water-saturated mantle transition zone inferred from mineral viscosity. *Science Advances* 3, e1603024. Doi: 10.1126/sciadv.1603024.

6. T. Yoshino, B. Zhang, B. Rhymer, C. Zhao, **H. Fei** (2017). Pressure dependence of electrical conductivity in forsterite. *Journal of Geophysical Research: Solid Earth* 122, 158-171.
  7. F. Xu, D. Yamazaki, N. Sakamoto, W. Sun, **H. Fei**, H. Yurimoto (2017). Silicon and oxygen self-diffusion in stishovite: implications for stability of SiO<sub>2</sub>-rich seismic reflectors in the mid-mantle. *Earth and Planetary Science Letters* 459, 332-339.
  8. L. Xie, A. Yoneda, T. Yoshino, **H. Fei**, E. Ito (2016). Graphite-boron composite heater in the Kawai-type apparatus: the inhibitory effect of boron oxide and countermeasures. *High Pressure Research* 36, 105-120.
  9. **H. Fei**, S. Koizumi, N. Sakamoto, M. Hashiguchi, H. Yurimoto, K. Marquardt, N. Miyajima, D. Yamazaki, T. Katsura (2016). New constraints on the transition from diffusion to dislocation creep in the upper-mantle. *Earth and Planetary Science Letters* 433, 350-359.
  10. **H. Fei**, T. Katsura (2016). Si and O self-diffusion in forsterite and iron-bearing olivine from the perspective of defect chemistry. *Physics and Chemistry of Minerals* 43, 119-126.
  11. **H. Fei**, M. Wiedenbeck, D. Yamazaki, T. Katsura (2014). No effect of water on oxygen self-diffusion rate in forsterite. *Journal of Geophysical Research: Solid Earth* 119, 7598-7606.
  12. **H. Fei**, M. Wiedenbeck, D. Yamazaki, T. Katsura (2013), Small effect of water on upper mantle rheology based on Si self-diffusion coefficients. *Nature* 498, 213-215.
  13. **H. Fei**, C. Hegoda, D. Yamazaki, M. Wiedenbeck, H. Yurimoto, S. Shcheka, T. Katsura (2012), High silicon self-diffusion coefficient in dry forsterite. *Earth and Planetary Science Letters* 345, 95-103.
- **Presentations in conferences:**
1. *School of Earth Sciences, Zhejiang University* (2017). **Talk**. Introduction to high pressure and high temperature experiments. Hangzhou, China.
  2. *Bayerisches Geoinstitut Academy Commission Business Meeting* (2017). **Poster**. Title: Ionic conductivity of natural olivine. Bayerisches Geoinstitut, Bayreuth, Germany.
  3. *School of Earth Sciences and Engineering, Nanjing University* (2017). **Invited talk**. Title: Conductivity anomaly in the oceanic asthenosphere due to water enhanced Mg diffusion. Nanjing University, Nanjing, China.
  4. *AGU Fall Meeting* (2016). **Invited talk**. Title: Dislocation mobility in ringwoodite and bridgmanite as a function of temperature and water-content. San Francisco, United States.
  5. *AGU Fall Meeting* (2016). **Talk**. Title: Negative activation volume of oxygen self-diffusion in forsterite. San Francisco, United States.
  6. *Bayerisches Geoinstitut Academy Commission Business Meeting* (2016). **Poster**. Title: A design of rapid quench cell. Bayerisches Geoinstitut, Bayreuth, Germany.
  7. *Bayerisches Geoinstitut Academy Commission Business Meeting* (2016). **Poster**. Title: Negative activation volume of oxygen self-diffusion coefficient in forsterite, Bayreuth, Germany.

8. *School of Earth Sciences and Engineering, Nanjing University* (2015). **Invited talk**. Title: Dislocation mobility in ringwoodite and bridgmanite and implications to rheology in the transition zone. Nanjing University, Nanjing, China.
9. *Bayerisches Geoinstitut Seminar* (2015). **Talk**. Title: Dislocation mobility in ringwoodite and bridgmanite and implications to mantle rheology. Bayerisches Geoinstitut, Bayreuth, Germany.
10. *JPGU Meeting* (2015). **Talk**. Title: Dislocation mobility in ringwoodite and perovskite. Chiba, Japan.
11. *JPGU Meeting* (2015). **Talk**. Title: Defect chemistry and diffusion in hydrous forsterite/olivine. Chiba, Japan.
12. *HACTO seminar* (2015). **Talk**. Title: Part I: Dislocation mobility in ringwoodite and perovskite. Part II: Defect chemistry and diffusion in hydrous forsterite/olivine. Okayama University. Misasa, Tottori, Japan.
13. *AGU Fall Meeting* (2014). **Talk**. Title: Silicon grain boundary diffusion in forsterite and implications to upper mantle rheology. San Francisco, United States.
14. *AGU Fall Meeting* (2014). **Poster**. Title: Water has no effect on oxygen self-diffusion rate in forsterite. San Francisco, United States.
15. *JPGU Meeting* (2014). **Talk**. Title: Diffusion to dislocation creep transition in the upper mantle. Yokohama, Japan.
16. *HACTO seminar* (2014). **Talk**. Title: Deformation mechanism in the upper mantle inferred from silicon self-diffusion. Okayama University. Misasa, Tottori, Japan.
17. *School of Earth Sciences and Engineering, Nanjing University* (2013). **Invited talk**. Title: Silicon diffusion in forsterite and deformation mechanism in the Earth's upper mantle. School of Earth Science and Engineering, Nanjing University, Nanjing, China.
18. *Bayerisches Geoinstitut Seminar* (2013). **Talk**. Title: Silicon grain-boundary diffusion in forsterite and deformation mechanism in Earth's upper mantle. Bayerisches Geoinstitut, Bayreuth, Germany.
19. *Bayerisches Geoinstitut Academy Commission Business Meeting* (2013). **Talk**. Title: Small effect of water on upper mantle rheology. Bayerisches Geoinstitut, Bayreuth, Germany.
20. *Bayerisches Geoinstitut Academy Commission Business Meeting* (2013). **Poster**. Title: Silicon grain boundary diffusion in dry forsterite. Bayerisches Geoinstitut, Bayreuth, Germany.
21. *AGU Fall Meeting* (2012). **Talk**. Title: Silicon self-diffusion coefficient in forsterite. San Francisco, United States.
22. *AGU Fall Meeting* (2012). **Poster**. Title: Small effect of water on upper mantle rheology based on Si self-diffusion coefficients. San Francisco, United States.
23. *Bayerisches Geoinstitut Academy Commission Business Meeting* (2012). **Poster**. Title: The effect of water on Si and O self-diffusion rates in forsterite. Bayerisches Geoinstitut, Bayreuth, Germany.
24. *EMPG XIV* (2012). **Poster**. Title: High silicon self-diffusion coefficient in dry forsterite. Kiel, Germany.

25. *ENB Doktoranden-seminar* (2012). **Talk**. Title: Silicon self-diffusion coefficient in forsterite. Thurnau, Germany.
  26. *Goldschmidt conference* (2011). **Talk**. Title: Silicon self-diffusion in forsterite, revisited. Prague, Czech Republic.
  27. *Bayerisches Geoinstitut Academy Commission Business Meeting* (2011). **Poster**. Title: Silicon self-diffusion in forsterite, revisited. Bayerisches Geoinstitut, Bayreuth, Germany.
  28. *ENB Doktoranden-seminar* (2011). **Talk**. Title: Measurement of Si and O self-diffusion coefficients in forsterite with various pressures and low water contents. Goldkronach, Germany.
- **Selected abstracts and reports:**
1. **H. Fei**, D. Yamazaki, M. Sakurai, N. Miyajima, H. Ohfuji, T. Katsura, T. Yamamoto (2016). Dislocation mobility in ringwoodite and bridgmanite as a function of temperature and water-content. AGU Fall Meeting 2016, MR14A-02 (invited). San Francisco, United States.
  2. **H. Fei**, M. Wiedenbeck, N. Sakamoto, H. Yurimoto, T. Yoshino, D. Yamazaki, T. Katsura (2016). Negative activation volume of oxygen self-diffusion in forsterite. AGU Fall Meeting 2016, MR42A-01. San Francisco, United States.
  3. **H. Fei**, S. Koizumi, N. Sakamoto, M. Hashiguchi, H. Yurimoto, T. Katsura (2016). Water-enhanced ionic conduction accounts for the high electrical conductivity at the top of oceanic asthenosphere. *Bayerisches Geoinstitut Annual Report 2016*. 90-92.
  4. **H. Fei**, A. Zarei, L. Wang, T. Katsura (2016). A design of rapid quench cell. *Bayerisches Geoinstitut Annual Report 2016*. 155-157.
  5. **H. Fei**, M. Wiedenbeck, N. Sakamoto, H. Yurimoto, T. Yoshino, D. Yamazaki, T. Katsura (2015). Pressure dependence of oxygen self-diffusion coefficient in forsterite. *Bayerisches Geoinstitut Annual Report 2015*. 133-134.
  6. **H. Fei**, D. Yamazaki, T. Katsura, M. Sakurai, N. Miyajima, H. Ohfuji, T. Yamamoto (2015). Dislocation recovery in ringwoodite and bridgmanite. *Bayerisches Geoinstitut Annual Report 2015*. 136-138.
  7. **H. Fei**, T. Katsura (2015), Defect chemistry and diffusion in hydrous forsterite. *JPGU Meeting 2015*, SIT03-03, Chiba, Japan.
  8. **H. Fei**, D. Yamazaki, H. Ohfuji, T. Yamamoto (2015), Dislocation mobility in ringwoodite as a function of temperature and water content, *JPGU Meeting 2015*, SIT04-16, Chiba, Japan.
  9. **H. Fei**, S. Koizumi, N. Sakamoto, M. Hashiguchi, H. Yurimoto, K. Marquardt, N. Miyajima, D. Yamazaki, T. Katsura (2014). Silicon grain boundary diffusion in forsterite and implications to upper mantle rheology. *AGU Fall Meeting 2014*, MR51A-03. San Francisco, United States.
  10. D. Yamazaki, **H. Fei**, M. Wiedenbeck, T. Katsura (2014), Water has no effect on oxygen self-diffusion rate in forsterite. *AGU Fall Meeting 2014*, MR23C-4364. San Francisco, United States.

11. **H. Fei**, T. Katsura, S. Koizumi, N. Sakamoto, M. Hashiguchi, H. Yurimoto, D. Yamazaki (2014), Diffusion to dislocation creep transition in the upper mantle inferred from silicon grain boundary diffusion rates. *JPGU Meeting 2014*, SIT03-04, Yokohama, Japan.
12. **H. Fei**, S. Koizumi, N. Sakamoto, M. Hashiguchi, H. Yurimoto, D. Yamazaki, T. Katsura (2014). Diffusion to dislocation creep transition in upper-mantle from Si grain-boundary diffusion. *European Geosciences Union 2014*, EGU2014-13835, Vienna, Austria.
13. **H. Fei**, S. Koizumi, N. Sakamoto, M. Hashiguchi, H. Yurimoto, D. Yamazaki, T. Katsura (2013). Deformation mechanism in the upper mantle inferred from silicon lattice and grain-boundary diffusion coefficients. *Bayerisches Geoinstitut Annual Report 2013*. 121-123.
14. **H. Fei**, M. Wiedenbeck, D. Yamazaki, T. Katsura (2012), Small effect of water on upper mantle rheology based on Si self-diffusion coefficients. *AGU Fall Meeting 2012*, DI13D-2448. San Francisco, United States.
15. T. Katsura, **H. Fei**, C. Hegoda, D. Yamazaki, M. Wiedenbeck, H. Yurimoto, S. Shcheka (2012). High silicon self-diffusion coefficient in dry forsterite. *AGU Fall Meeting 2012*, MR31A-02. San Francisco, United States.
16. **H. Fei**, M. Wiedenbeck, D. Yamazaki, T. Katsura (2012), Small effect of water on upper mantle rheology based on Si self-diffusion coefficients. *Bayerisches Geoinstitut Annual Report 2012*. 151-153.
17. **H. Fei**, M. Wiedenbeck, D. Yamazaki, T. Katsura (2012), The effect of water on oxygen self-diffusion coefficients in forsterite. *Bayerisches Geoinstitut Annual Report 2012*. 153-155.
18. **H. Fei**, C. Hegoda, D. Yamazaki, S. Chakraborty, R. Dohmen, M. Wiedenbeck, H. Yurimoto, S. Shcheka, T. Katsura (2012), High silicon self-diffusion coefficient in dry forsterite. *EMPG XIV*, Kiel, Germany.
19. **H. Fei**, C. Hegoda, D. Yamazaki, S. Chakraborty, R. Dohmen, M. Wiedenbeck, H. Yurimoto, S. Shcheka, T. Katsura (2011), High silicon self-diffusion coefficient in dry forsterite. *Bayerisches Geoinstitut Annual Report 2011*. 152-154.
20. **H. Fei**, T. Katsura, S. Chakraborty, R. Dohmen, C. Hegoda, D. Yamazaki, M. Wiedenbeck, H. Yurimoto, S. Shcheka, K. Pollok, A. Audétat (2011), Silicon self-diffusion in forsterite, revisited. *Goldschmidt Conference 2011*, Prague, Czech Republic, *Mineralogical Magazine*, 75 (3), 834.

## EXPERIMENTAL EXPERIENCES

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- Multi anvil, piston cylinder apparatus, gas mixing furnace.
- FT-IR spectrometry; SIMS, Raman spectrometry; powder and single crystal X-ray diffraction; Microprobe; SEM; EBSD; FIB; TEM; ICP-MS.
- High quality polishing technique, lathe.
- VB, C/C++, C# programming.

Updated on Jan. 02, 2018