Bin Chen

Hawai‘i Institute of Geophysics and Planetology
School of Ocean and Earth Science and Technology, University of Hawai‘i at Mānoa
Mailing Address: 1680 East West Rd. #602, Honolulu, Hawaii 96822, U.S.A.
Tel: +1 (808) 956-6908 (office) • Fax: +1 (808) 956-3188 • E-mail: binchen@hawaii.edu

NARRATIVE OF RESEARCH EXPERIENCE

Dr. Bin Chen's research focuses on understanding complex planetary processes under extreme pressure–temperature conditions, with the aim of illuminating the structure and thermo-chemical evolution of rocky and icy planets and moons. His program in high-pressure experimental mineral physics addresses how the volatile elements — carbon, hydrogen, oxygen, and sulfur — govern the structure, dynamics, and evolution of planetary interiors, from Earth's deep mantle and core to Mercury, the ice giants, and carbon-rich exoplanets. With expertise in multi-anvil press and diamond anvil cell techniques, Dr. Chen has been an active user of synchrotron beamline facilities at the Advanced Photon Source (APS), Advanced Light Source (ALS), and NSLS-II for more than two decades. His group investigates the equations of state, phase relations, melting behavior, and transport properties of minerals and metallic alloys under the extreme pressure–temperature conditions relevant to planetary interiors, aiming to clarify how volatile elements partition among core, mantle, and surface reservoirs across different redox environments, and how those processes shape planetary differentiation and long-term evolution. Dr. Chen has led research programs supported by NASA and NSF, and has published broadly across mineralogy and petrology, geochemistry, geophysics, and planetary science.

EDUCATION

2004-2009:	**Ph.D.** in **Geology**, University of Illinois at Urbana-Champaign (UIUC), Urbana, Illinois
2001-2004:	**M.S.** in **Geochemistry**, University of Science and Technology of China (USTC), Hefei, Anhui Province, China
1997-2001:	**B.S.** in **Geochemistry**, University of Science and Technology of China (USTC), Hefei, Anhui Province, China

PROFESSIONAL APPOINTMENTS

2023–:	**Researcher**, Hawai‘i Institute of Geophysics and Planetology (HIGP), School of Ocean and Earth Science and Technology (SOEST), University of Hawai‘i at Mānoa (UHM)
2019–2023:	**Associate Researcher (tenured)**, HIGP, SOEST, UHM
2014–2019:	**Assistant Researcher (tenure-track)**, HIGP, SOEST, UHM
2013:	**Research Assistant Professor**, Dept. Geology, UIUC / **COMPRES Chief Technology Officer** at the Advanced Photon Source, Argonne National Laboratory, Argonne, IL
2011–2013:	**Assistant Research Scientist**, Department of Earth and Environmental Sciences, University of Michigan, Ann Arbor, MI
2011:	**Postdoctoral Fellow**, Department of Earth and Environmental Sciences, University of Michigan, Ann Arbor, MI
2009–2011:	**Texaco Postdoctoral Scholar**, Division of Geological and Planetary Sciences, California Institute of Technology, Pasadena, CA

AWARDS & HONORS

2020–:	**Sigma Xi** scientific research honor society
2018–2019:	**COMPRES Distinguished Lecturer**, Consortium for Materials Properties Research in Earth Science (COMPRES)
2016–2022:	**Faculty Early Career Development (CAREER) Award**, National Science Foundation (NSF)
2010:	**J. C. Jamieson Award**, Gordon Research Conference (Research at High Pressure)

PROFESSIONAL SOCIETY MEMBERSHIPS

2004–: Member, American Geophysical Union
2014–: Member, Mineralogical Society of America
2024–: Member, American Chemical Society

SELECTED RECENT PUBLICATIONS

1. Berrada, M., Chen, B., Chao, K.-H., Peckenpaugh, J., Wang, S., Zhang, D., Nguyen, P., & Li, J. (2024). Phase Transitions and Thermal Equation of State of Fe-9wt.%Si Applied to the Moon and Mercury. *Journal of Geophysical Research: Planets*, *129*(11), e2024JE008466. https://doi.org/10.1029/2024JE008466
2. Berrada, M., Hu, G., Zhou, D., Wang, S., Nguyen, P. Q. H., Zhang, D., Prakapenka, V., Chariton, S., Chen, B., Li, J., & Nicholas, J. D. (2024). Detection of thin film phase transformations at high-pressure and high-temperature in a diamond anvil cell. *Communications Earth & Environment*, *5*(1), 73. https://doi.org/10.1038/s43247-024-01234-9
3. Chao, K.-H., Berrada, M., Wang, S., Peckenpaugh, J., Zhang, D., Chariton, S., Prakapenka, V., & Chen, B. (2024). Structure and equation of state of Ti-bearing davemaoite: New insights into the chemical heterogeneity in the lower mantle. *American Mineralogist*. https://doi.org/10.2138/am-2023-9104
4. Chen, B., Lai, X., Li, J., Liu, J., Zhao, J., Bi, W., Ercan Alp, E., Hu, M. Y., & Xiao, Y. (2018). Experimental constraints on the sound velocities of cementite Fe_3C to core pressures. *Earth and Planetary Science Letters*, *494*, 164–171. https://doi.org/10.1016/j.epsl.2018.05.002
5. Chen, B., & Li, J. (2016). Carbon in the Core. In *Deep Earth* (Vol. 207, pp. 277–288). John Wiley & Sons, Inc. https://doi.org/10.1002/9781118992487.ch22
6. Chen, B., & Wang, J. (2020). Structure and Properties of Liquid Fe-C Alloys at High Pressures by Experiments and First-Principles Calculations. In *Carbon in Earth's Interior* (pp. 37–45). American Geophysical Union (AGU). https://doi.org/10.1002/9781119508229.ch4
7. Huang, S., Wu, X., Chariton, S., Prakapenka, V., Qin, S., & Chen, B. (2024). Thermoelastic Anomaly of Iron Carbonitride Across the Spin Transition and Implications for Planetary Cores. *Geophysical Research Letters*, *51*(16), e2024GL108973. https://doi.org/10.1029/2024GL108973
8. Huang, S., Wu, X., Zhu, F., Lai, X., Li, J., Neill, O. K., Qin, S., Rapp, R., Zhang, D., Dera, P., Chariton, S., Prakapenka, V. B., & Chen, B. (2021). High-Pressure Phase Stability and Thermoelastic Properties of Iron Carbonitrides and Nitrogen in the Deep Earth. *Journal of Geophysical Research: Solid Earth*, *126*(6), e2021JB021934. https://doi.org/10.1029/2021JB021934
9. Lai, X., Chen, B., Wang, J., Kono, Y., & Zhu, F. (2017). Polyamorphic transformations in Fe-Ni-C liquids: Implications for chemical evolution of terrestrial planets. *Journal of Geophysical Research: Solid Earth*, *122*(12), 9745–9754. https://doi.org/10.1002/2017JB014835
10. Lai, X., Zhu, F., Gao, J., Greenberg, E., Prakapenka, V. B., Meng, Y., & Chen, B. (2022). Melting of the Fe-C-H System and Earth's Deep Carbon-Hydrogen Cycle. *Geophysical Research Letters*, *49*(13), e2022GL098919. https://doi.org/10.1029/2022GL098919
11. Lai, X., Zhu, F., Liu, Y., Bi, W., Zhao, J., Alp, E. E., Hu, M. Y., Zhang, D., Tkachev, S., Manghnani, M. H., Prakapenka, V. B., & Chen, B. (2020). Elastic and magnetic properties of Fe3P up to core pressures: Phosphorus in the Earth's core. *Earth and Planetary Science Letters*, *531*, 115974. https://doi.org/10.1016/j.epsl.2019.115974
12. Wang, S., Berrada, M., Chao, K.-H., Lai, X., Zhu, F., Zhang, D., Chariton, S., Prakapenka, V. B., Sinogeikin, S., & Chen, B. (2023). Externally Heated Diamond ANvil Cell Experimentation (EH-DANCE) for studying materials and processes under extreme conditions. *Review of Scientific Instruments*, *94*(12), 123902. https://doi.org/10.1063/5.0180103
13. Zhu, F., Lai, X., Wang, J., Williams, Q., Liu, J., Kono, Y., & Chen, B. (2022). Viscosity of Fe-Ni-C Liquids up to Core Pressures and Implications for Dynamics of Planetary Cores. *Geophysical Research Letters*, *n/a*(n/a), e2021GL095991. https://doi.org/10.1029/2021GL095991