

Qingyang Hu

Date and Place of Birth: April 5, 1987; Hangzhou, China

Address: Center for High Pressure Science and Technology Advanced Research
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Education: Ph.D. George Mason University, Computer Science, 2014
B.S. Beijing Jiaotong University, Optical Science, 2009

Professional Experience

Center for High Pressure Science and Technology Advanced Research, Beijing 2017 - current

Staff Scientist

- Independent PI managing a research group.
- Building a laboratory dedicated for high-pressure mineral chemistry by combining x-ray probes, Raman, laser heating and diamond anvil cell.

Department of Geological Sciences, Stanford University, Stanford, CA 2016 - 2017

Postdoctoral Researcher

- Proposed and confirmed the hypothesis of mantle oxygen reservoir based on experimental findings of oxygen-rich mineral phases like FeO_2 and Fe_4O_7 .
- Established new theories about the separation of oxygen-hydrogen cycling at the lowermost mantle with publications in world's leading journals.

Geophysical Laboratory, Carnegie Institution of Washington, Washington, DC. 2014 - 2016

Postdoctoral Associate

- Found a new iron oxide FeO_2 that is relevant to the origin of the Great Oxidation Event.
- Advanced experiment protocols to directly observe mineral chemistry between iron-oxides (e.g. FeO , Fe_2O_3) and water under the conditions of the lower mantle.

Department of Physics and Astronomy, George Mason University, Fairfax, VA 2009 - 2014

Research Assistant

- Found the metastable transition of silica by single-crystal crystallography.
- Modelled the free-energy surface of silica polymorphs using first-principles molecular dynamics.
- Developed python-based codes for visualizing crystals and analyzing x-ray data.
- Publish over 10 peer-reviewed articles in field's top journals.

Academic Achievement (as of 27th, December, 2023)

Total Publications 77 (Web of Science), 79 (Google Scholar)
h-index 24 (Web of Science), 26 (Google Scholar)
Total citation 2463 (Web of Science), 2890 (Google Scholar)

Research Grant

- 2022-2026 NSFC Program. [42150101]
Water cycle and transportation mechanism in Earth's deep lower mantle
Amount: 2,870,000 CNY, PI.
- 2022-2026 National Key R&D Program of China [2022YFA1405500]
Novel hydrogen-rich high temperature superconductor under high pressure
Amount: 5,000,000 CNY, member
- 2021-2025 The Tencent XPLOERER prize. [XPLOERER-2020-1013]
Amount: 3,000,000 CNY, PI.
- 2021-2023 CAEP Research Innovation grant. [CX20210048]
The physiochemical property and energy storing capability of Fe-O compounds under ultra-high-pressure conditions
Amount: 800,000 CNY, PI.
- 2017-2022 Foreign talent program for young scientist: Geophysics.
Amount: 3,000,000 CNY, PI.

Professional Service

- 2022- Editorial board (youth), *Matter and Radiation at Extremes*
- 2021- Editorial board (youth), *National Science Review*
- 2019- Member of European Geosciences Union, Germany.
- 2019- Member of Mineralogical Society of America, U.S.A.
- 2013- Member of American Physics Society, U.S.A.
- 2013- Member of American Geophysical Union, U.S.A
- 24/05 Session co-convener, 9th Geoscience Forum for Early Career Scientist, Xiamen, China
- 24/05 Session convener, 7th International Conf. on Matter and Radiation at Extremes, Hangzhou, China
- 24/03 Session co-convener, American Physics Society March Meeting, Minneapolis, MN, USA
- 22/11 Organizing committee, “*Nat. Conf.*: Frontiers of High Pressure Research”, Shanghai, China
- 18/08 Session co-convener, Goldschmidt conference, Boston, MA, USA.

Honors and Award

- 2023 Houdefeng Youth Scientist Award for Mineral Physics and Geochemistry, *China*
- 2022 GRC Van Valkenburg Award
- 2021 MRE Youth Scientist Award, American Institute of Physics.
- 2020 The XPLOER prize, *China*.
- 2018 2018 Peer Review Awards (top 1% in Chemistry), *Publons*
- 2017 Top 10 Up-and-Coming Young Scientist, the Knowledge Magazine, *China*
- 2016 Outstanding Paper Award, Chinese High-Pressure Science Conference, *China*
- 2015 IUCr Young Scientist Award, International Union of Crystallography (Geophysics)
- 2015 Award for Outstanding CSI Dissertation, George Mason University, *Fairfax, VA*
- 2012 Carnegie Predoctoral Fellowship, Carnegie Institution of Washington, *Washington, DC*

Supervised Post-doctors and Research Associates (2):

Yukai Zhuang (AP@Sichuan U.), Linfei Yang (AP@Jindezhen Ceramic U.)

Supervised Ph.D. students (4):

Sensen Wu, Junwei Li, Xuyan Cao, Songsong Han, Chenghe Bai

Conference & Talks

- 24/04 [Hu, Q., et al.](#), GMPV4.9: “Water modulate the Fe-Mg partitioning in Earth’s deep lower mantle”
Oral, European Geosciences Union General Assembly, *Vienna, Austria*.
- 24/03 [Hu, Q., et al.](#), topic #9, “Crystallization of magma ocean and CMB differentiation in the early Earth”
Invited, Chinese Geophysics Union Annual Conference for Early Career Scientist, *Xi’an, China*.
- 23/12 [Hu, Q.](#), Tracing deep water, *Seminar*, Chengdu Institute of Technology
- 23/12 [Hu, Q.](#), Deep water, *Seminar*, Jindezhen Ceramic University
- 23/12 [Hu, Q., et al.](#), MR32A-06: “Chemistry of organic carbon coagulation in Earth's deep interiors”
Oral, American Geophysics Union Annual Conference, *San Francisco, CA, USA*.
- 23/12 [Hu, Q., et al.](#), MR13A-05: “One dimensional superionic conduit in ultrahydrous stishovite”
Invited, American Geophysics Union Annual Conference, *San Francisco, CA, USA*.
- 23/10 [Hu, Q.](#), “Superstructure of hydrous stishovite”.
Invited, the 9th Conference of Chinese Crystallographic Associate, *Fuzhou, Fujian*.
- 23/10 [Hu, Q.](#), “Water: the Chemical engine from deep Earth”.
Invited, the 3rd conference on multidisciplinary sciences for Early career scientist, *Wuhan, Hubei*.
- 23/09 [Hu, Q.](#), “Role of water, hydrous mineral and organic matter in Earth’s materials cycling”.
Invited, the 18th Conference on Organic Earth sciences, *Changsha, Hunan*.
- 23/09 [Hu, Q.](#), “Chemistry of water during magma ocean crystallization”.
Oral, Habitable Earth - Geoscience for Sustainability, *Qingdao, Shandong*.

- 23/08 Hu, Q., “Conversion of inorganic-organic carbon in deep Earth”.
Oral, the 2nd Conference on Bio-geoscience, *Xishuangbanna, Yunnan*.
- 23/07 Hu, Q., “Seismic anisotropy at Earth’s core mantle boundary”.
Poster, Gordon Research Conference: Interior of the Earth, *South Hadley, MA, USA*.
- 23/07 Hu, Q., “Seismic wave velocity of Al-rich hydrous phases at Earth’s core mantle boundary”.
Oral, Goldschmidt 2023, Lyon, France.
- 23/04 Hu, Q. *Seminar*, Jilin University. *Changchun, China*.
- 23/02 Hu, Q., “Deep water cycle: case of superionic hydrous minerals”.
Invited, the 2nd conference on multidisciplinary sciences for Early career scientist, *Nanjing*.
- 22/12 Hu, Q., *Seminar*, Institute of Deep-sea and Science and Engineering, CAS, *Sanya, China*.
- 22/12 Hu, Q., “Packing water molecules in dense stishovite”.
Poster, American Geophysical Union Annual Meeting, *online*.
- 22/10 Hu, Q. *Seminar*, Fujian Institute of Research on the Structure of Matter, CAS. *Fuzhou, China*.
- 22/08 Hu, Q., “The controlling effect of deep water for a habitable Earth”.
Invited, Fragrance Hill Science Conference S68, *Beijing*.
- 22/07 Hu, Q., “Chemistry, transport properties and architecture of dense water-bearing phases”.
Invited, Gordon Research Conference: Research at High Pressure, Holderness, *NH, U.S.A.*
- 22/07 Hu, Q., “Electrical conductivity of hydrous FeOOH and FeO₂H_x”.
Oral, Goldschmidt 2022, *Honolulu, HI, U.S.A.*
- 22/04 Hu, Q. *Seminar*, State Key Laboratory of Superhard Materials, Jilin University. *Changchun, China*.
- 21/12 Hu, Q., Hou, M., He, Y. and Yukai Zhuang. “Electrical Conductivity of Hydrous FeOOH and FeO₂H_x”.
Invited, Asian Conference on High Pressure Research. *online*.
- 21/10 Hu, Q., “The storage, chemistry and transportation of water in Earth’s deep lower mantle”.
Invited, ALBA-II workshop, Spain. *online*.
- 21/09 Hu, Q. *Public talk*, CC Forum, *Beijing, China*.
- 21/08 Hu, Q. “Phase transition of Hydrous FeOOH”.
Oral, Tencent Xplorer’s 50² meeting, *Shenzhen, Guangzhou, China*.
- 21/07 Hu, Q., “Deep water”.
Invited, 6th Geoinformation Science Conference. *Shanghai, China*.
- 21/04 Hu, Q., Hou, M. and He, Y. “Solid to superionic transition in iron oxide-hydroxide”.
Oral, European Geosciences Union General Assembly 2021, *online*.
- 21/05 Hu, Q. *Interview*, by the *Knowledge Magazine*.
- 21/04 Hu, Q. *Seminar*, International Center for Computational Method and Software, Jilin University.
- 21/04 Hu, Q. *Seminar*, Institution of Geology and Geophysics, CAS.
- 21/04 Hu, Q. *Seminar*, Fujian Institute of Research on the Structure of Matter, CAS.
- 21/04 Hu, Q. “Fe-O-H chemistry under high pressure”.
Invited, CCS annual meeting, *Zhuhai, Guangdong, China*.
- 20/12 Hu, Q. and Mao, H.-K. “Interaction between water and ferropicicase in Earth’s lower mantle”.
Invited, AGU Fall Meeting, *online*.
- 20/10 Hu, Q., *Seminar*, IOP-CAS-HPSTAR collaborative symposium, Jilin University, *Huaiyou, China*.
- 20/09 Hu, Q., *Seminar*, Forum for Physics Frontiers, Jilin University, *Changchun, China*.

- 20/09 Hu, Q. *et al.* “Metallic hydrous phase with implication to mantle electrical heterogeneity”.
Oral, COMPRES 2020, *Tenerife, Spain.*
- 20/08 Hu, Q., *Seminar*, Sichuan University, *Chengdu, China.*
- 20/07 Hu, Q. *et al.* “Reservoirs and behavior of hydrogen in Earth’s lower mantle”.
Oral, EHPRG 2020, *Yellowstone, USA.*
- 20/06 Hu, Q., *Seminar*, Oxygen fugacity in subduction slabs, *online.*
- 20/05 Hu, Q. and Mao, H.-K. “Mineral reservoirs and behaviors of hydrogen in Earth’s lower mantle”.
Solicited talk, European Geosciences Union General Assembly 2020, *Vienna, Austria.*
- 20/04 Hu, Q. “Ionization of H in iron oxy-hydroxide”.
Oral, APS March Meeting, *Denver, CO. U.S.A.*
- 19/12 Hu, Q. Liu, J., Mao, H.-K. and Mao, W.L. “Water Mineral chemistry in Earth’s lower mantle”.
Poster, AGU Fall Meeting, *San Francisco, CA. U.S.A.*
- 19/12 Hu, Q. “Simple and novel chemistry of Fe under high pressure”.
Oral, 2nd High Pressure Chemistry conference, *Guangzhou, China.*
- 19/10 Hu, Q. “Influence of water in lower mantle mineral”.
Invited, CGU annual meeting, *Beijing, CA. U.S.A.*
- 18/12 Hu, Q., *et al.*, “A mechanism for oxygen concentration changes in Fe₂O₃ and FeO₂”.
Oral, CGU annual meeting, *San Francisco, CA. U.S.A.*
- 18/12 Hu, Q., *Seminar*, China University of Geoscience (Wuhan), *Wuhan, China.*
- 18/10 Hu, Q., “Iron oxides under deep lower mantle conditions”.
Invited, National Youth Geoscience Conference, Nanjing, China
- 18/10 Hu, Q., “Oxygen enriched phase in deep Earth”.
Invited, *Annual Meeting of Chinese Geoscience Union*, Beijing, China
- 18/09 Hu, Q., “The mechanism of synthesizing high-pressure superoxide”.
Oral, IUCr workshop of high pressure crystallography, Tianjin, China
- 18/08 Hu, Q., “Synthesis of oxygen-rich materials in deep Earth's interior”.
Invited, 17th High Pressure Meeting of China, Changchun, Jilin
- 18/05 Hu, Q., *Seminar*, Wuhan University of Technology, *Wuhan, China.*
- 18/05 Hu, Q., *Seminar*, University of Science and Technology of China, *Hefei, China.*
- 18/04 Hu, Q., *Seminar*, University of Nevada at Las Vegas, *NV, USA.*
- 18/04 Hu, Q., *Seminar*, Nanjing University, *Nanjing, China.*
- 18/04 Hu, Q., *Seminar*, Institute of Geology and Geophysics, CAS, *Beijing, China.*
- 18/04 Hu, Q., *Geology Seminar*, Peking University, *Beijing, China.*
- 18/03 Hu, Q., “Mineralogy and redox in Earth’s lower mantle”,
Invited, Deep Volatile, Energy & Environments Summit, *Shanghai, China.*
- 17/12 Hu, Q., *et al.*, Dehydrogenation Mechanism and Phase Transition Kinetics in High-pressure FeO₂H”,
Oral, AGU Fall Meeting, *New Orleans, CA, U.S.A.*
- 17/10 Hu, Q., “Hydrogen and oxygen cycles in Earth’s deep interiors”,
Oral talk, 1st HYU-HPSTAR-CIS workshop, *Jeju, South Korea.*
- 17/09 Hu, Q., *et al.*, “Dehydration mechanism of FeO₂H_x”,
Poster, 5th High Power Laser workshop at SLAC, *Menlo Park, CA, USA.*

- 17/08 Hu, Q., et al., “Formation of FeO₂ at high pressure and Earth’s oxygen cycling”,
Invited, The 26th International Conference on High Pressure Science and Technology, *Beijing, China*.
- 17/03 Hu, Q., Mao, H.-K., Mao, W.L., “Discovery of pyrite-structured FeO₂ at high pressure”,
Oral, American Physics Society March Meeting, *New Orleans, LA, U.S.A.*
- 16/12 Hu, Q., *et al.*, “Synthesis of FeO₂ and the Fe-O-H ternary system in lower mantle”.
Invited, AGU Fall Meeting, *San Francisco, CA, U.S.A.*
- 16/04 Hu, Q. and Mao, H.-K., “Phase transitions in the Fe-O-H ternary system at high pressure and high temperature”,
Invited, Frolic Goats Workshop on High Pressure Diffraction, *Poznań, Poland*.
- 15/12 Hu, Q. “Polymorphic Phase Transition Mechanism in Compressed Coesite”,
Oral, Materials Research Society, *Boston, MA, U.S.A.*

Publication (2012/1-2023/12)

2023

77. 胡清扬*, 白乘禾, 黄铁矿型(Fe,Mg)O₂H 晶体到超离子态相变. *矿物岩石地球化学通报*. 42, 112, [10.19658/j.issn.1007-2802.2023.42.112](https://doi.org/10.19658/j.issn.1007-2802.2023.42.112) (2023).
76. Li, L., Lin, Y., Meier, T., Liu, Z., Yang, Y., Zhu, S.*, and Hu, Q.* and Zhang, Y.*, Silica-water superstructure and one-dimensional superionic conduit in Earth's mantle. *Sci. Adv.* 9, eadh3784 (2023).
75. 胡清扬*, 罗根明*, 李元*, 大气增氧机制: 地球表层过程与深部氧化还原状态的耦合. *Chin. Sci. Bull.* [10.1360/TB-2023-0109](https://doi.org/10.1360/TB-2023-0109) (2023).
74. Gan, B., Jiang, G., Huang, Y., Zhang, H., Hu, Q.* and Zhang, Y.*, Phase diagram and thermoelastic property of iron oxyhydroxide across the spin crossover under extreme conditions. *Phys. Rev. B* 107, 064106 (2023).
73. Li, J., Geng, Y., Xu, Z., Zhang, P., Garbarino, G., Miao, M., Hu, Q.* and Wang, X.* Mechanochemistry and the evolution of ionic bonds in dense silver iodide. *J. Am. Chem. Soc. Au*, 3, 402-408 (2023).
72. Guo, S., Mao, Y., Chen, C., Zhang, Y., Zhao, G., Bu, K., Hu, Q., Zhu, H., Zou, G., Yang, W., Mao, L. and Lü, X., Pressure distinguishes the dual emissions in pseudohalide 2D Ruddlesden-Popper perovskite Cs₂Pb(SCN)₂Br₂, *CCS Chem.*, [10.31635/ccschem.023.202303436](https://doi.org/10.31635/ccschem.023.202303436) (2023)
71. Mao, Y., Guo, S., Huang, X., Bu, K., Li, Z., Nguyen, P.Q.H., Liu, G., Hu, Q., Zhang, D., Fu, Y., Yang, W.*, and Lü, X.*, Pressure-modulated anomalous organic-inorganic interactions enhance structural distortion and second-harmonic generation in MHyPbBr₃ perovskite. *J. Am. Chem. Soc.*, 145, 23842-23848 (2023).
70. Luo, H., Bu, K., Yin, Y., Wang, D., Shi, C., Guo, S., Fu, T., Liang, J., Liu, B., Zhang, D., Xu, L.-J., Hu, Q., Ding, Y., Jin, S., Yang, W., Ma, B., Lü, X., Anomalous charge transfer from organic ligands to metal halides in zero-dimensional [(C₆H₅)₄P]₂SbCl₅ enabled by pressure-induced lone pair- π Interaction. *Angew. Chem. Intl. Ed.* 62, e202304494 (2023).
69. Fu, T., Bu, K., Sun, X., Wang, D., Feng, X., Guo, S., Sun, Z., Fang, Y., Hu, Q., Ding, Y., Zhai, T., Huang, F.*, Lü X.*, Manipulating Peierls distortion in van der Waals NbOX₂ maximizes second-harmonic generation. *J. Am. Chem. Soc.* 145, 16828-16834 (2023).

2022

68. Lin, Y.*, Hu, Q.*, Walter M.J.*, Yang J., Meng, Y., Feng X., Zhuang Y., Cohen R.E. and Mao, H.-k.* Hydrous SiO₂ in subducted oceanic crust and H₂O transport to the core-mantle boundary. *Earth Planet. Sci. Lett.*, 594, 117708 (2022).
67. Zhuang, Y. and Hu, Q.* The evolution of electrical conductivity and semiconductor to metal transition of iron oxides at extreme conditions. *Chin. Phys. B*, 31, 089101 (2022).
66. Hu, Q.* and Tang, M. Tracing the anharmonicity and superionic phase transition of hydrous FeO₂H. *Front. Earth Sci.* 10, 913122 (2022).
65. Zhu, S.*, Gu, W., Zhang D., Xu, L., Liu Z.-P., Mao, H.-k., and Hu, Q.*, Topological ordering of memory glass on extended length scales. *J. Am. Chem. Soc.* 144, 7414-7421 (2022).
64. Zhuang, Y., Gan, B., Cui, Z., Tang R., Tao R., Hou M., Gang, J., Catalin P., Gaston G., Zhang Y., and Hu, Q.*, Mid-mantle water transportation implied by the electrical and seismic properties of ϵ -FeOOH. *Sci. Bull.* 67, 748-754 (2022).
63. Huang S. and Hu, Q.* Medium-range structure motifs of complex iron oxides. *J. Appl. Phys.*, 131, 070902 (2022).

62. Zhuang, Y., Li, J., Lu, W., Yang, X., Du, Z.* and Hu, Q.* High temperature melting curve of basaltic glass by laser flash heating. *Chin. Phys. Lett.*, 39, 020701 (2022).
61. Wu, S., Liu, C., Li, X., Xiao, B.* and Hu, Q.* Freeze-thaw controlled aggregation mechanism of humic acid-coated goethite: Implications for organic carbon preservation. *Geoderma*, 406, 115514 (2022).
60. Guo, S., Li, Y., Mao, Y., Tao, W., Bu, K., Fu, T., Zhao, C., Luo, H., Hu, Q., Zhu, H., Shi, E., Yang, W., Dou, L., and Lü, X. Reconfiguring band-edge states and charge distribution of organic semiconductor-incorporated 2D perovskites via pressure gating. *Sci. Adv.* 8, eadd1984 (2022).
59. Bu, K., Hu, Q., Qi, X., Wang, D., Guo, S., Luo, H., Lin, T., Guo, X., Zeng, Q., Ding, Y., Huang, F., Yang, W., Mao, H.-k. and Lü, X. Nested order-disorder framework containing a crystalline matrix with self-filled amorphous-like innards. *Nat. Commun.* 13, 4650 (2022).
58. Nakagawa, T.* , *et al.*, Hu, Q., Ding, Y.* and Mao H.-k. Piezochromic luminescence of dicoronylene: Key for revealing hidden Raman modes at high pressure. *Carbon*, 197, 563-569 (2022).
57. Ishii, T.* , Miyajima, N., Criniti, G., Hu, Q., Glazyrin, K. and Katsura T. High pressure-temperature phase relations of basaltic crust up to mid-mantle conditions. *Earth. Planet. Sci. Lett.* 584, 117472 (2022).
56. Zhu, S.-c.* , Huang, Z.-b., Hu, Q. and Xu, L. Pressure tuned incommensurability and guest structure transition in compressed scandium from machine learning atomic simulation. *Phys. Chem. Chem. Phys.* 24, 7007-7013 (2022).

2021

55. Hu, Q., Li, B.* , Gao, X., Lei, S., Yan B., and Mao, H.-K. Ultrasound elasticity of diamond at gigapascal pressures. *Proc. Nat. Acad. Sci. U.S.A.*, 118, e2118490118 (2021).
54. Hu, Q.* and Mao, H.-K. Role of hydrogen and proton transportation in Earth's deep mantle. *Matter Radiat. Extreme.*, 6, 068101 (2021).
53. Hu, Q.* and Mao, H.-K. Born's valence force-field model for diamond at terapascals: Validity and implications for the primary pressure scale. *Matter Radiat. Extreme.*, 6, 068403 (2021).
52. Hu, Q., Liu, J.* , Chen J., Yan B., Meng Y., Prakapenka, V.B., Mao, W.L. and H.-K. Mao*, Mineralogy of the deep lower mantle in the presence of H₂O. *Natl. Sci. Rev.*, 8, nwa098 (2021).
51. Hu, Q.*, Liu, J. Deep mantle hydrogen in the pyrite-type FeO₂-FeO₂H system. *Geoscience. Front.* 12, 975-981 (2021).
50. Hou, M., He, Y., *et al.*, Liu, J*., Kim, D.K.* , Hu, Q.*, *et al.*, Superionic iron oxide-hydroxide in Earth's deep mantle. *Nat. Geosci.* 14, 174-178 (2021).
49. Cui, Z., Bu, K., Zhuang, Y., Donnelly M.-E., Zhang, D., Dalladay-Simpson P., Howie, R., Zhang, J., Lü, X., and Hu, Q.* Phase transition mechanism and bandgap engineering of Sb₂S₃ at gigapascal pressures. *Commun. Chem.*, 4, 125 (2021).
48. Liu, J.* , Wang, C., Lü, C., Su, X., Liu, Y., Tang, R., Chen, J., Hu, Q.*, Mao, H.-K. and Mao W.L., Evidence for oxygenation of Fe-Mg oxides at mid-mantle conditions and the rise of deep oxygen. *Natl. Sci. Rev.*, 8, nwa096 (2021).
47. Mao, H.-K.* , Ding Y., Hu, Q., Lin, Y., Liu, J. and Zhang, L., The deep Earth engine driving major surface events. *Acta Geol. Sin. Engl.* 95, 68-69 (2021).
46. Zhu, S.-c.* and Hu, Q., Unraveling the structural transition mechanism of room-temperature compressed graphite carbon. *Phys. Chem. Chem. Phys.* 23, 20560-20566 (2021).
45. Tang, R.* , Jin L., Kim, D.Y., Mao, H.-K.* , Hu, Q., *et al.*, Chemistry and *P-V-T* equation of state of FeO₂H_x at the base of Earth's lower mantle and their geophysical implications. *Sci. Bull.* 66, 1954-1958 (2021).

44. Deng, H.*, Zhang, J., Jeong, M.Y., Wang, D., Hu, Q., *et al.* Han, M.J.*, Chang, J.*, Weng, H., Yang, D.*, *et al.*, Metallization of quantum material GaTa₄Se₈ at high pressure. *J. Phys. Chem. Lett.* 12, 5601-5607 (2021).
43. Guo, S., Bu, K., Li, J.; Hu, Q., Luo, H., He, Y., Wu, Y., Zhang, D., Zhao, Y., Yang, W., Kanatzidis, M.G. and Lü, X.*, Enhanced photocurrent of all-inorganic two-dimensional perovskite Cs₂PbI₂Cl₂ via pressure-regulated excitonic features. *J. Am. Chem. Soc.* 143, 2545-2551 (2021).
42. Zhuang, Y., Su, X., Salke, N.P., Cui, Z., Hu, Q., Zhang, D. and Liu, J. The effect of nitrogen on the compressibility and conductivity of iron at high pressure. *Geoscience. Front.* 12, 983-989 (2021).
41. Lü, X., Stoumpos, C., Hu, Q., *et al.* Regulating off-centering distortion maximizes photoluminescence in halide perovskites. *Natl. Sci. Rev.* 8, nwa288 (2021).

2020

40. Lin, Y.*, Hu, Q.*, Zhu, L. and Meng, Y. Structure and stability of iron fluoride at high pressure–temperature and implication for a new reservoir of fluorine in the deep Earth. *Minerals* 10, 783 (2020).
39. Zhuang, Y., Wu, L., Gao, B., Cui, Z., Gou, H., Zhang, D., Zhu, S.* and Hu, Q.* Deviatoric stress induced quasi-reconstructive phase transition in ZnTe. *J. Mater. Chem. C.* 8, 3795-3799 (2020).
38. Lin, Y., Hu, Q.*, Meng, Y., Walter, M. and Mao, H.-K., Evidence for the stability of ultrahydrous stishovite in Earth's lower mantle. *Proc. Nat. Acad. Sci. U.S.A.* 117, 184-189 (2020).
37. Kong, L., Gong, J., Hu, Q., Capitani, F., Celeste, A., Hattori, T., Sano-Furukawa, A., Li, N., Yang W., Liu, G. and Mao H.-K. Suppressed lattice disorder for large emission enhancement and structural robustness in hybrid lead iodide perovskite discovered by high-pressure isotope effect. *Adv. Funct. Mater.* 2009131 (2020).
36. Wang, Y., Guo, S., Luo, H., Zhou, C., Lin, H., Ma, X., Hu, Q., Du, M.-H., Ma, B., Yang, W. and Lü, X. Reaching 90% photoluminescence quantum yield in one-dimensional metal halide C₄N₂H₁₄PbBr₄ by pressure-suppressed nonradiative loss. *J. Am. Chem. Soc.* 142, 16001-16006. (2020).
35. Kong, L., Liu, G., Gong, J., Mao, L., Chen, M., Hu, Q., Lü, X., Yang, W., Kanatzidis, M.G. and Mao, H.-K. Highly tunable properties in pressure-treated two-dimensional Dion-Jacobson perovskites. *Proc. Nat. Acad. Sci. U.S.A.* 117, 16121-16126 (2020).
34. Qin, Q., Wan, B., Yan B., Gao, B., Hu, Q., Zhang, D., Hosono, H. and Gou, H. Potential Interaction of Noble Gas Atoms and Anionic Electrons in Ca₂N. *J. Phys. Chem. C.* 124, 12213-12219 (2020).
33. Liu, G., Kong, L., Hu, Q. and Zhang, S. Diffused morphotropic phase boundary in relaxor-PbTiO₃ crystals: High piezoelectricity with improved thermal stability. *Appl. Phys. Rev.* 7, 021405, (2020).

2019

32. Liu, J., Hu, Q.*, Bi, W., Yang, L., Xiao, Y., Chow, P., Meng, Y., Prakapenka, V. B., Mao, H.-K.* and Mao, W. L*. Altered chemistry of oxygen and iron under deep Earth conditions. *Nat. Commun.* 10, 153 (2019).
31. Zhuang, Y., Cui, Z., Zhang, D., Liu, J., Tao, R. and Hu, Q.*, Experimental Evidence for Partially Dehydrogenated ε-FeOOH. *Crystals*, 9, 356 (2019).
30. Zhu, S., Liu, J., Hu, Q.*, Mao, W. L., Meng, Y., Zhang, D., Mao, H.-K. and Zhu, Q.* Structure-controlled oxygen concentration in Fe₂O₃ and FeO₂. *Inorg. Chem.* 58, 5476-5482 (2019).
29. Jang, B.G., Liu, J., Hu, Q., Haule, K., Mao, H.-K., Mao, W.L., Kim, D.Y. and Shim, J.H. Electronic spin transition in FeO₂: Evidence for Fe(II) with peroxide FeO²⁻. *Phys. Rev. B* 100, 014418 (2019).
28. Mao, H.-K., Ding, Y., Kim, D.Y., Hu, Q., Liu, J., Yang, L., Yang, W., Zhang, L. and Mao, W.L. Global scale

uniformitarianism and catastrophism dictated by crust-to-core volatile cycles. *Acta. Geol. Sin.-Engl.*, 93, 8-8 (2019).

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