American Mineralogist, Volume 106, page 845, 2021

Presentation of the Mineralogical Society of America Award for 2020 to Jin Liu

Ho-kwang "David" Mao[1,*]

[1]Center for High Pressure Science and Technology Advanced Research (HPSTAR), Beijing 100094, China

President Frost, Ladies, and Gentlemen of the Mineralogical Society of America:

It is my great pleasure and honor to present Jin Liu, the recipient of the MSA Award in 2020. Although this is a youth award for a recipient under the age of 35, the award itself is not young but double that age. This one is exactly the 70th award since the first MSA Award was presented to Frank Tuttle by Director Norman Bowen of the Geophysical Lab, Carnegie Institution, in 1951. As Bowen put it, this is "an award to be given for a specific accomplishment indicating great promise." A low age limit is needed to fulfill that promise. Jin Liu has certainly met the two conditions: he has demonstrated outstanding published contributions in mineralogy and showed greater future promise at the early stage of his career.

Now is also the most exciting time in high-pressure mineralogy. Starting from the beauty and symmetry of minerals, our mineralogical studies have evolved from finding new minerals in the solid Earth and measuring their properties to understanding how the minerals in great depth dictate the environment and habitability on the surface. Jin Liu has made seminal contributions to this advancement. For example, in his 2017 *Nature* paper, Jin Liu investigated interactions between iron and water at the conditions of the Earth's deep lower mantle and found that they formed a new iron peroxide phase, which may provide an alternative explanation for some of the complex seismic features observed at the core-mantle boundary. He continued with his 2019 *Nature Communications* paper, where he demonstrated novel oxygen-oxygen interactions in the iron peroxide and multiple oxygen valence states in the deep interior. The existence of this extremely oxygen-rich phase has important implications for the evolution of mantle redox and deep volatile storage, transport, and cycling. The process leads to major surface events such as the Great Oxidation Event and Large Igneous Province.

Jin Liu shows true love in mineralogy. Coming from his hometown of Yancheng in China's east seashore, to his pre-graduate work on ore exploration in Tibet, to laboratory studies of fluid inclusions for the Master's program at Peking University, he was well prepared to go into the deep Earth mineralogy. Jin Liu spent five years at the Ph.D. program at the University of Texas, Austin, under the mentorship of Afu Lin, and proceeded to work three years as a postdoc fellow at Stanford University under Wendy Mao. Both are leading centers of deep Earth experimental studies. Jin Liu is careful, driven, and does not shy away from tackling the most challenging problems. Since the success of cutting-edge mineral physics research often depends on our ability to characterize the samples at extreme conditions, it is critically important that experimentalists in this area be well-versed in current techniques as wells as involved in new developments. With great dedication and an insatiable thirst for science, Jin Liu mastered nearly all diamond-anvil cell technology, especially state-of-the-art synchrotron X-ray diffraction, spectroscopy, and imaging probes.

Jin Liu has made a series of breakthroughs on one of the most central problems in deep Earth science—the interaction between the oxide mantle and iron core at the core-mantle boundary (CMB) near 2900 km depth. He has accumulated an extraordinary publication record with 51 papers and an H-index of 21. For someone less than five years out of their Ph.D., the sheer volume is extraordinary, but more importantly, the quality is also very high. AIRAPT, the dominant organization for the international high-pressure science and technology community, has bestowed Jin Liu the 2019 John Calhoun Jamieson Award, which is a young scientist award selected only one distinguished young scientist every two years among the entire international multidisciplinary high-pressure physics, chemistry, materials, biology, and geoscience community. It is a recognition of Dr. Jin Liu's accomplishment as well as a recognition of the advances of the mineral physics field as a whole.

Two years ago, Jin Liu joined a very young institution in China, the HPSTAR, which is an exact copy of the Geophysical Lab, of Carnegie Institution, supporting its staff members to pursue open, basic research on their own terms without any strings attached. With Jin Liu's vision, expertise, dedication, and youth, and the paradigm changes of the deep Earth mineralogy, we can certainly anticipate a great future with Jin Liu carrying the torch. I am thoroughly delighted to present to you the 2020 MSA Awardee, Dr. Jin Liu.

* E-mail: maohk@hpstar.ac.cn

0003-004X/21/0005–845$05.00/DOI: https://doi.org/10.2138/am-2021-AP10655