Memorial for Shigeho Sueno, 1937–2001

CHARLES T. PREWITT,¹ JAMES J. PAPIKE,² AND GORDON E. BROWN JR.³

¹Geophysical Laboratory, Carnegie Institution of Washington, Washington, D.C. 20015, U.S.A.
 ²Department of Geology, University of New Mexico, Albuquerque, New Mexico 87131, U.S.A.
 ³Department of Geological and Environmental Sciences, Stanford University, Stanford, California 94305, U.S.A.

Shigeho Sueno, Fellow of the Mineralogical Society of America, passed away in Tsukuba, Japan, on March 11, 2001. At the date of his retirement in March 2000, he was a Professor of Mineralogy at the University of Tsukuba and was well known to many members of MSA and the international mineralogical community. He received his B.Sc. degree from Chiba University and his M.Sc. and Ph.D. degrees from the University of Tokyo where he worked with Professor R. Sadanaga. In 1970, he accepted a postdoctoral appointment in the Department of Earth and Space Sciences at the State University of New York at Stony Brook. In a very productive four years at Stony Brook, he collaborated extensively with the three authors of this Memorial and also with Maryellen Cameron, Ken Cameron, Joan Clark, John Konnert, Ted Bence, John Delano, and Walter Hamilton. One of the main features of this work involved hightemperature, single-crystal diffraction studies over a wide range of mineral structures. Shigeho was the principal person involved in the design and construction of a single-crystal furnace for diffraction experiments that was capable of temperatures to 1100 °C, and which design was subsequently adopted and sold by several x-ray equipment companies. The data produced at Stony Brook using this device are still the most comprehensive of their kind and have encouraged many other investigations of mineral properties at non-ambient temperatures and pressures.

Upon completing his postdoctoral work at Stony Brook, Shigeho spent a year in Germany where he worked with Professor H. Jagodzinski at the Institut für Kristallographie und Mineralogie der Universität, Münich. He then returned to Japan in 1975 and was appointed Associate Professor in the Institute of Geoscience at the University of Tsukuba. He was promoted to Professor in June 1988. Shigeho led a productive research group at the University and published over 130 papers on various subjects including x-ray diffraction and ion microprobe studies of earth, meteoritic, and planetary materials, as well as crystallographic studies of the YBCO high Tc superconductors. He was President of the Mineralogical Society of Japan in 1994-07, Vice President of the International Mineralogical Association in 1996–2000, and elected Fellow of MSA in 1995.

Shigeho maintained his ties with the group at Stony Brook and eventually established a cooperative program that resulted in exchange and collaborative research among the staff of the two institutions. He was very generous with his knowledge of



mineral structures and was among the first mineralogists to use high-pressure diamond anvil cell methods at the Photon Factory in Tsukuba, Japan. He is also well known for designing various types of high temperature-high pressure devices that allowed collection of X-ray intensity data on minerals and other solids at high temperatures and pressures. Shigeho was a loyal friend to those of us who were fortunate to know him well and was devoted to his family. He had a dry humor, an unconventional and refreshing way of viewing the world of science and different cultures, and a love of travel that took him to different parts of the world. He will be missed.

Shigeho is survived by his wife, Tokiko Sueno, and three children, Shunichi, Mikio, and Keiko.

SELECTED PUBLICATIONS OF SHIGEO SUENO

Sadanaga, R. and Sueno, S. (1967) X-ray study on the a-b transition of Ag₂S. Mineralogical Journal, 5, 124–143.

Ohmasa, M. and Sueno, S. (1968) Film developers adapted to x-ray intensity measurements. Journal of the Mineralogical Society of Japan, 8, 304–315.

Inomata, Y., Inoue, Z., Mitomo, M., and Sueno, S. (1969) Wurtzite (2H-) type sili-

con carbide whiskers obtained in a Lely furnace. Yogyo Kyokai Shi, 77, 143-144.

- Tagai, T., Sueno, S., and Sadanaga, R. (1970) Phase transition and polytypism among SiC polytypes. Journal of the Mineralogical Society of Japan, 9, 475–478.
- Sueno, S., Takeda, H., and Sadanaga, R. (1970) Two-dimensional regular aggregates of layered crystals. Mineralogical Journal, 6, 172–185.
- Tagai, T., Sueno, S., and Sadanaga, R. (1971) Thermal transformations in SiC crystals. Mineralogical Journal, 6, 240–248.
- Inoue, Z., Sueno, S., Tagai, T., and Inomata, Y. (1971) New polytype of silicon carbide 9T. Journal of Crystal Growth, 8, 179–183.
- Sueno, S., Papike, J.J., Prewitt, C.T., and Brown, G.E. (1972) Crystal structure of high cummingtonite. Journal of Geophysical Research, 77, 5767–5777.
- Brown, G.E., Prewitt, C.T., Papike, J.J., and Sueno, S. (1972) A comparison of the structures of low and high pigeonite. Journal of Geophysical Research, 77, 5778– 5789.
- Cameron, M., Sueno, S., Prewitt, C.T., and Papike, J.J. (1973) High-temperature crystal chemistry of acmite, diopside, hedenbergite, jadeite, spodumene, and ureyite. American Mineralogist, 58, 594–618.
- Sueno, S., Cameron, M., Papike, J.J., and Prewitt, C.T. (1973) The high temperature crystal chemistry of tremolite. American Mineralogist, 58, 649–664.
- Sueno, S., Clark, J.R., Papike, J.J., and Konnert, J.A. (1973) Crystal-structure refinement of cubic boracite. American Mineralogist, 58, 691–697.
- Brown, G.E., Sueno, S., and Prewitt, C.T. (1973) A new single-crystal heater for the precession camera and four-circle diffractometer. American Mineralogist, 58, 698–704.
- Papike, J.J., Prewitt, C.T., Sueno, S., and Cameron, M. (1973) Pyroxenes; comparisons of real and ideal structural topologies. Zeitschrift f
 ür Kristallographie, 138, 254–273.
- Brown, G.E., Hamilton, W.C., Prewitt, C.T., and Sueno, S. (1974) Neutron diffraction study of Al/ Si ordering in sanidine; a comparison with X-ray diffraction data. The feldspars, Proceedings of a NATO Advanced Study Institute, p. 68– 80. Manchester University Press, Manchester, England.
- Sueno, S., Cameron, M., and Prewitt, C.T. (1976) Orthoferrosilite; high-temperature crystal chemistry. American Mineralogist, 61, 38–53.
- Prewitt, C.T., Sueno, S., and Papike, J.J. (1976) The crystal structures of high albite and monalbite at high temperatures. American Mineralogist, 61, 1213–1225.
- Sueno, S., Prewitt, C.T., and Ohmasa, M. (1980) Topotactic decomposition of some silicates. Journal of the Mineralogical Society, 4, 339–363.
- Hirai, H., Sueno, S., and Nakazawa, H. (1982) A lamellar texture with chemical contrast in grandite garnet from Nevada. American Mineralogist, 67, 1242– 1247.
- Adlhart, W., Tzafaras, N., Sueno, S., Jagodzinski, H., and Huber, H. (1982) An xray camera for single-crystal studies at high temperatures under controlled atmosphere. Journal of Applied Crystallography, 15, 236–240.
- Miyano, S., Sueno, S., Ohmasa, M., and Fujii, T. (1982) A new silicon carbide polytype, 45Rb. Acta Crystallographica, A38, 477–482.
- Cameron, M., Sueno, S., Papike, J.J., and Prewitt, C.T. (1983) High temperature crystal chemistry of K and Na fluor-richterites. American Mineralogist, 68, 924– 943.
- Sueno, S. and Prewitt, C.T. (1983) Models for the phase transition between orthoferrosilite and clinoferrosilite. Fortschritte der Mineralogie, 61, 223–241.
- Yurimoto, H. and Sueno, S. (1984) Anion and cation partitioning between olivine, plagioclase phenocrysts and the host magma; a new application of ion microprobe study. Geochemical Journal, 18, 85–94.
- Sueno, S., Kimata, M., and Prewitt, C.T. (1984) The crystal structure of high clinoferrosilite. American Mineralogist, 69, 264–269.
- Sueno, S., Prewitt, C.T., and Kimata, M. (1985) Structural aspects of phase transitions in Fe-Mg-Ca pyroxenes. American Mineralogist, 70, 141–148.
- Sueno, S., Matsuura, S., and Prewitt, C.T. (1985) Fe-deficient olivine structure type minerals from Colorado, U.S.A. and Japan. Mineralogical Journal, 12, 376– 392.
- Yurimoto, H. and Sueno, S. (1987) Anion and cation partitioning between three pyroxenes, chrome spinel phenocrysts and the host boninite magma; an ion microprobe study. Geochemical Journal, 21, 85–104.
- Okamura, F.P., Sueno, S., Nakai, I., and Ono, A. (1987) Crystal structure of barium yttrium copper oxide (Ba₂YCu_{3-x}O_{7-y}): a superconductive compound determined by x-ray single crystal diffraction method. Materials Research Bulletin, 22, 1081– 1085.
- Yurimoto, H., Kurosawa, M., and Sueno, S. (1989) Hydrogen analysis in quartz crystals and quartz glasses by secondary ion mass spectrometry. Geochimica et

Cosmochimica Acta, 53, 751–755.

Yurimoto, H., Yamashita, A., Nishida, N., and Sueno, S. (1989) Quantitative SIMS analysis of GSJ rock reference samples. Geochemical Journal, 23, 215–236.

- Shearer, C.K., Papike, J.J., Simon, S.B., Shimizu, N., Yurimoto, H., and Sueno, S. (1990) Ion microprobe studies of trace elements in Apollo 14 volcanic glass beads; comparisons to Apollo 14 mare basalts and petrogenesis of picritic magmas. Geochimica et Cosmochimica Acta, 54, 851–867.
- Yurimoto, H., Sakaguchi, I., Nishida, N., and Sueno, S. (1991) Determination of nickel in GSJ standard rock samples using secondary ion mass spectrometry. Geostandards Newsletter, 15, 155–159.
- Sakaguchi, I., Yurimoto, H., and Sueno, S. (1992) Self-diffusion along dislocations in single-crystal magnesia. Solid State Communications, 84, 889–893.
- ——(1992) Strontium and silicon simultaneous diffusion in single-crystal magnesia. Journal of the American Ceramic Society, 75, 3477–3480.
- ——(1992) Calcium diffusion along high-diffusivity paths in single-crystal magnesia. Journal of the American Ceramic Society, 75, 712–715.
- Maruyama, S., Yurimoto, H., Sueno, S., and Kurita, K. (1993) Fe-Mg zoning in olivines of Allende chondrules. In T. Hoshiai, Ed. Papers presented to the Eighteenth symposium on Antarctic meteorites., 18, p. 110-113. National Institute of Polar Research, Tokyo, Japan.
- Miyashita, S., Kato, Y., Komatsu, H., Inoue, T., Hayashi, S., Horiuchi, H., and Sueno, S. (1993) Decomposition of bismuth strontium calcium copper oxide BSCCO(2212) phase studied by in situ observation. Physica C, 213, 283–286.
- Noma, S., Saito, T., Ekino, T., Akimitsu, J., and Sueno, S. (1993) Superconducting phase in niobium tantalum selenide (Nb_{1-x}Ta_xSe₃) (0.135 < x < 0.16). Physical Review B, 48, 9620–9627.
- Matsumoto, K., Yurimoto, H., Kosaka, K., Miyata, K., Nakamura, T., and Sueno, S. (1993) A novel ion imager for secondary ion mass spectrometry. IEEE Transactions on Electron Devices, 40, 82–85.
- Sueno, S. (1995) High energy ion beams; useful probes for mineral chemical analysis. European Journal of Mineralogy, 7, 1273–1297.
- ——(1995) Application of high energy ion beam to the mineral sciences. Journal of the Mineralogical Society of Japan, 24, 149–158.
- Wang, W., and Sueno, S. (1996) Discovery of a NaPx-En inclusion in diamond: possible transition zone origin. Mineralogical Journal, 18, 9–16.
- Kurosawa, M., Yurimoto, H., and Sueno, S. (1997) Patterns in the hydrogen and trace element compositions of mantle olivines. Physics and Chemistry of Minerals, 24, 385–395.
- Taura, H., Yurimoto, H., Kurita, K., and Sueno, S. (1998) Pressure dependence on partition coefficients for trace elements between olivine and the coexisting melts. Physics and Chemistry of Minerals, 25, 469–484.
- Sueno, S., Matsuura, S., Gibbs, G.V., and Boisen, M.B., Jr. (1998) A crystal chemical study of protoanthophyllite; orthoamphiboles with the protoamphibole structure. Physics and Chemistry of Minerals, 25, 366–377.
- Wang, W., Takahashi, E., and Sueno, S. (1998) Geochemical properties of lithospheric mantle beneath the Sino-Korea Craton; evidence from garnet xenocrysts and diamond inclusions. In T. Fujii, D.B. Dingwell, and B.O. Mysen, Eds., Magmatology; the role of magmas in the evolution of the Earth., 107; 1–3, p. 249–260. Elsevier, Amsterdam, Netherlands.
- Kurosawa, M., Sueno, S., Shima, K., Ohsima, H., Ishii, S., Kamiya, H., Kimoto, S., Ohyi, H., and Hayashi, K. (1998) Development of a new sample chamber for proton microprobe analysis of mineral samples. Nuclear Instruments and Methods, 142, 599–605.
- Maruyama, S., Yurimoto, H., and Sueno, S. (1999) Oxygen isotope evidence regarding the formation of spinel-bearing chondrules. Earth and Planetary Science Letters, 169, 165–171.
- Wakatsuki, M., Ohnishi, A., Jia, X.P., Kurosawa, M., Sueno, S., Hayakawa, S., and Gohshi, Y. (1999) Growth of diamond with Zr-containing molten metal solvents and metal elements as incorporated impurities. Diamond and Related Materials, 8, 1438–1440.
- Kawashima, T., Sueno, S., and Kanda, H. (2000) Precipitation of diamond and graphite from super-cooled molten metal in a Ni-C system under HPHT conditions. New Diamond and Frontier Carbon Technology, 10, 283–289.
- Wang, W.Y., Sueno, S., Takahashi, E., Yurimoto, H., and Gasparik, T. (2000) Enrichment processes at the base of the Archean lithospheric mantle: observations from trace element characteristics of pyropic garnet inclusions in diamonds. Contributions to Mineralogy and Petrology, 139, 720–733.
- Taura, H., Yurimoto, H., Kato, T., and Sueno, S. (2001) Trace element partitioning between silicate perovskites and ultracalcic melt. Physics of the Earth and Planetary Interiors, 124, 25–32.