Gilbert Y. Chin

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1934-1991

By Jack H. Wernick

GILBERT CHIN, a physical metallurgist by formal training, made significant contributions to our understanding and applications of crystal plasticity and to the development of new magnetic alloys for telecommunications. Just prior to his death, he was a leader of a productive group doing significant research and development in the areas of optical fibers, electronic ceramics, and materials for high-temperature superconductivity. He died on May 5, 1991, at the age of fifty-six.

Gilbert was elected to the National Academy of Engineering in 1982. At the time of his death, he was director of the Passive Components Research Laboratory at AT&T Bell Laboratories, Murray Hill, New Jersey.

Born in Kwangtung, China, on September 21, 1934, Gilbert received his B.S. and Sc.D. degrees in metallurgy from the Massachusetts Institute of Technology in 1959 and 1963, respectively. He joined the AT&T Bell Laboratories research area in 1962. Among his contributions to metallurgy and materials science, two major contributions stand out; they are in the areas of crystal plasticity and magnetic alloys, which he had coupled with creativity and leadership. In earlier work, he combined the Taylor theory of plastic flow and the Chikazumi theory of directional order to predict the deformation-induced magnetic anistropy of nickel-iron alloys. This basic understanding led Chin and his colleagues to develop a manufacturing process for

optimizing the magnetic properties of nickel-iron wires for use in a magnetic memory that became the heart of the nation's first telephone electronic switching system.

Gilbert also pushed forward the frontier of crystal plasticity research by teaming with a colleague mathematician to become the first to use linear programming to solve the Taylor analysis of polycrystalline flow. He also extended the Taylor theory of slip to include twinning, which work Sir G. I. Taylor communicated to the Royal Society. This program continued with more than thirty papers, culminating in a series dealing with the plastic behavior of ionic solids, which won him the prestigious Champion H. Mathewson Gold Medal of the American Institute of Mining, Metallurgical, and Petroleum Engineers as the most significant contribution to metallurgical science during a three-year period. He also used his understanding of crystal plasticity to develop a novel processing technique for achieving the highest combination of strength and ductility in several copper-based alloys.

Chin's second contribution was the development with his colleagues of a new family of low-cobalt chromium-cobalt-iron ductile permanent magnet alloys, which can be formed at room temperature, along with the successful transfer of this new technology to production of one of these alloys for use in telephone receivers at an annual cost savings of several million dollars.

Gilbert was the holder of eleven patents and author or coauthor of more than 140 publications. Among his many awards and honors he was elected a fellow of the Metallurgical Society of AIME, class of 1981, the total number limited to one hundred living members. He was also elected a fellow of the American Society for Metals (ASM) in 1983 and was ASM's Sauver Memorial Lecturer for 1985. He was frequently sought after to organize symposia and to chair important materials science committees.

His service on national committees included work for the National Research Council, as well as the University Materials Council and the National Science Foundation. For the National Research Council, he served from 1980 to 1982 on the Committee on Materials Substitution Methodology, National Materials

Advisory Board; in 1984-1985 on the Committee on New Magnetic Materials, National Materials Advisory Board; and in 1985-1987 on the Committee on Army Basic Scientific Research, Board on Physics and Astronomy. From 1986 to 1989 he served on the Panel on Education in Materials Science and Engineering, a joint activity of the National Materials Advisory Board and the Board on Physics and Astronomy. In addition, from 1986 to 1988 he served on the Policy Committee of the University Materials Council, and from 1986 to 1989 he served on the Materials Research Advisory Committee of the National Science Foundation.

Gilbert's devotion as a son, husband, and father is equally as significant as his contributions to science and technology. He made sure that his family (as well as his younger brothers and sister) became highly educated.