



Robert E Neerham

ROBERT E. NEWNHAM

1929–2009

Elected in 1989

*“For contributions to the development of composite materials
for electronic applications.”*

BY L. ERIC CROSS AND SUSAN TROLIER-MCKINSTRY

ROBERT EVEREST NEWNHAM, Alcoa Professor Emeritus of Solid State Science at the Pennsylvania State University, passed away April 16, 2009, at the age of 80. He retired from Penn State in 1999 after serving eight years as associate director of the Materials Research Laboratory and 18 years as director of the Intercollege Program on Solid State Science. Bob is remembered with great love by friends, former students, and scientific colleagues around the globe.

He was born March 28, 1929, in Amsterdam, New York, to William E. and Dorothy M. Hamm Newnham.

On July 26, 1964, Bob married Patricia Friss Newnham, a beautiful nurse from E. Hartford, Connecticut, who survives him. Bob and Pat had two children: a son, Randall E. Newnham of Reading, Pennsylvania, and a daughter, Rosemary E. Newnham of New York City. They survive, along with Randall’s wife, Janet Graden, grandson Jonathan Robert Newnham, and Rosemary’s husband, Patrick Ying and grandson Henry Everest Ying, born January 2010. His sister Mary Lucy Carlson, her husband Rupert, numerous nieces and nephews, and their families also survive.

A graduate of four universities, Bob studied mathematics at Hartwick College (B.S., 1950), physics at Colorado State University (M.S., 1952), physics and mineralogy at Penn State (Ph.D., 1956), and crystallography at Cambridge University (Ph.D., 1960). Prior to joining the Penn State faculty in 1966, he was an ICI fellow at the Cavendish Laboratory of Cambridge University and taught in the Department of Electrical Engineering, Massachusetts Institute of Technology (MIT) for 10 years.

At Penn State, Bob taught courses on crystal physics, crystal chemistry, electroceramics, mineralogy, gem minerals, biomaterials, x-ray diffraction, and crystal structure analysis. Widely known for his enthusiastic lectures and colorful illustrations, Bob was honored with the Outstanding Educator Award of the Ceramic Education Council and the Wilson Teaching Prize of the College of Earth and Mineral Sciences. During his career, he delivered the Dow lectures at Northwestern University, the Wolff Lecture at MIT, the McMahan Lecture at Alfred University, the Pond lectures at Johns Hopkins, the Maddin Lecture at the University of Pennsylvania, and the Byron Short Lecture at the University of Texas. After retirement Bob taught for two years at the Hong Kong Polytechnic University and the Georgia Institute of Technology.

Professor Newnham was a master teacher. It is easy to see why when you read any of his lucid books. He had a gift for taking difficult concepts and explaining them simply without introducing error.

Professor Newnham was active in several professional societies, serving as editor of the *Journal of the American Ceramic Society*, secretary of the Materials Research Society, president of the American Crystallographic Association, and distinguished lecturer for the Institute of Electrical and Electronics Engineers (IEEE). Among his many awards was the Jeppson Medal, the E. C. Henry Award, the Bleininger Award, the David Kingery Award of the American Ceramic Society, the third Millennium Medal and Ultrasonics Achievement Award of the IEEE, the Centennial Award of the Japan Ceramics Society, the

Turnbull Lecturer Award of the Materials Research Society, the Adaptive Structures Prize of the American Society of Mechanical Engineers, the Benjamin Franklin Medal for Electrical Engineering from the Franklin Institute, and the Basic Research Award of the World Academy of Ceramics.

A member of the National Academy of Engineering, Bob Newnham wrote five books and more than 500 research papers and held 20 patents on electroceramics and composite materials for electronic and acoustic applications.

Early in his scientific career, he was a crystallographer. He loved minerals, structure property relations, and symmetry. Generations of students remember the “symmetry dance” he did to show the four principal symmetry operators. He did structure refinements of many important minerals, including the feldspars, several layer silicates, fersnoite, and the bismuth layer structure ferroelectrics. His knowledge of minerals and structure-property relations was encyclopedic. One summer he memorized the name and chemical formula of every mineral.

His work in electroceramics began in quartz piezoelectrics and continued through a long and productive professional relationship with Eric Cross. The two were great personal friends. Together, they built up one of the largest ferroelectrics research programs in the world. Bob and Eric for decades were the pivotal force in the United States in the field of ferroelectric materials. The two of them educated an entire generation of ferroelectricians. Together they explored the field of secondary and tertiary ferroics, as well as piezoelectrics, electrostrictors, capacitors, and composites.

The composite piezoelectric transducers developed in his laboratory revolutionized the quality of ultrasound images in cardiology, obstetrics, and Navy sonar. Every major ultrasonics manufacturer in the world uses composite transducers based on his designs. He was truly proud that his invention became ubiquitous in the field of biomedical ultrasound. He spoke several times of the thousands of people whose lives he had been instrumental in saving through this invention. Many of us who knew him were encouraged to go out and do something worthwhile for humanity. His miniature flex-

tensional transducers for hydrophone-towed arrays are one of Penn State's most successful patents. They are widely used in underwater oil exploration and geophysical research.

In private life, Bob was an unabashed liberal in politics and religion. He and his wife, Pat, were strong supporters of the peace movement, the Unitarian-Universalist Fellowship of Centre County, Pennsylvania, and numerous liberal charities. In his spare time he was an ardent mineral collector and model airplane builder. He used to say he loved the smell of airplane glue.

He was a great scientist, teacher, colleague, friend, and person. His life is an inspiration to all of us.

