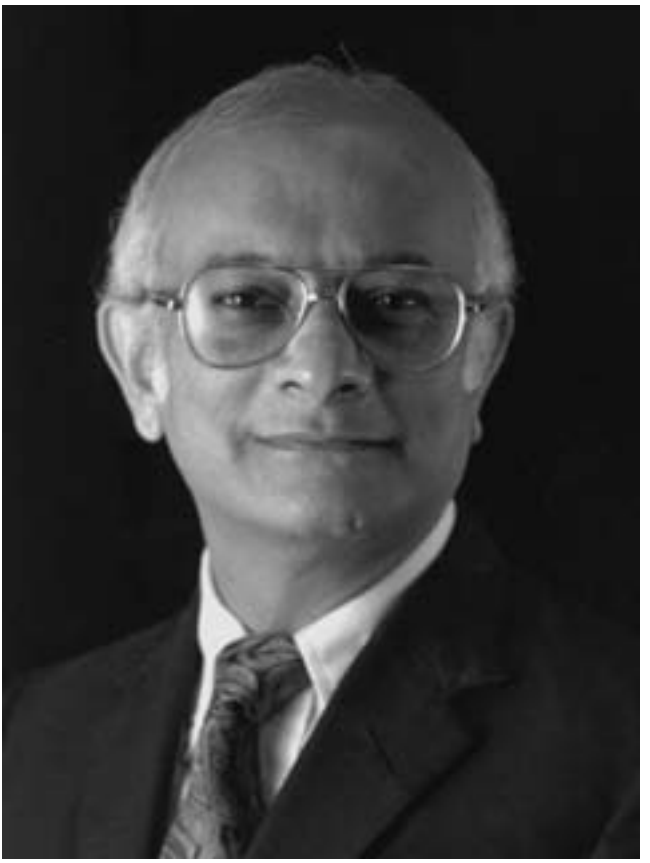

RUSTUM ROY

1924–2010

Elected in 1973

"For contributions to the development of the modern science and technology of non-metallic materials."

BY L. ERIC CROSS

RUSTUM ROY was one of the world's leading materials scientists but also a major moving force in the fields of national and international science policy and of constructive interaction between science, technology, and religion. A very strong advocate of interdisciplinary and integrative learning, he was a brilliant teacher, immensely popular with students and younger faculty, but often regarded with suspicion and even some hostility by senior administrators as a strong force for change that might endanger some of their local bases of power. He was an inspiration to many seeking change to benefit humanity and his passing is a great loss to both science and society.

Rustum was born in Ranchi Bihar province in India on July 3, 1924. The family was very well connected, and an early meeting with the great Mahatma Gandhi left a very deep and lasting influence on Roy, which helped embed his lifelong dedication to molding scientific endeavor to benefit the needs of society. Rustum took a Cambridge School Certificate from Saint Paul's School Darjeeling, then a B.Sc. (Honors) and an M.Sc. in chemistry at Patna University in 1944, followed by a Ph.D. in ceramic science from the Pennsylvania State University in 1948. He joined the Penn State faculty as a research associate in 1950 and then as an assistant professor in 1951, rising rapidly

to full professor of geochemistry in 1957. In 1962 he founded the Materials Research Laboratory (MRL) at Penn State, the first in the country without block grant support. In 1981 he was named an Evan Pugh Professor, the highest academic title the university can bestow.

The MRL under Professor Roy's leadership was a lively happy place to work, as he led by example and not by edict. He worked an incredibly long day, and before the advent of the Internet his phone was ringing off the hook during normal hours, so the best time to meet for discussion was 10 p.m. to midnight. Obviously, there was no bickering over the distribution of central funds as there was no central budget. Proposals, as in all U.S. research groups, were an absolute necessity but exciting topics for targeted basic studies were constantly nucleated, targeted in areas that Rustum knew were of vital importance to specific federal and state agencies, and the success rate was truly heartening.

It is interesting to note that in 2004 Thomas Register, who kept the statistics, commented in surprise that Penn State had 12 highly cited faculty in materials studies compared to 6 at the next highest academic institution, the very prestigious materials program at Cornell University. MRL faculty, however, was not surprised as, in fact, Rustum had been heavily involved in recruiting 9 of the highly cited 12.

In his own group Roy was a major innovator in the whole area of new materials synthesis techniques. Starting in 1948 he devised what is now called the solution sol-gel process for making pure nanoscale reactive powders for many important ceramic compositions. Originally devised for making ultrahomogeneous materials, the group was later able to show that the process could be adapted to making maximally heterogeneous nanocomposites with most exciting properties.

A second major area developed with his colleague O. F. Tuttle was hydrothermal processing for materials synthesis and crystal growth. Tuttle focused on geological applications and Roy on materials applications. A third area of immense practical importance were the far-reaching studies of

microwave electromagnetic processing—starting with pure SiO_2 and Al_2O_3, which were thought to be completely microwave transparent and moving to semiinsulators like tungsten carbide, and even powder metals in 2.45-H microwave fields. For the first time, using single-mode cavities the group clearly demonstrated the amazing differences generated by pure E and H microwave fields with major consequences for proper theoretical understanding.

Although a practicing scientist for 65 years, his life work defied any professional label: he was dedicated to breaking artificial boundaries in order to integrate science, religion, education, health, art, and social action for human benefit.

Roy probably holds the unofficial record for the synthesis of more new ceramic materials than anyone else in history. He trained and exported worldwide several generations of students with outstanding crystal chemical backgrounds, and his class notes, never published, have been reproduced and used worldwide. We are much saddened by our great loss but vastly heartened by the thought of his joyous new surroundings and the excitement he will have on learning full details of the organization of our amazing materials universe.

Rustum helped create a small "Christian base community," the Sycamore Community in State College, Pennsylvania, a local focus for many years of church activity. Somehow he found time for voluminous correspondence, dozens of phone calls a day, and a vital family life with his wife, children, and the extended Roy clan. Rustum worked tirelessly, often returning to the office after a family dinner, or a game of frisbee, to burn the midnight oil. He never missed a chance to combine work and pleasure, often finding time during his trips to gather friends for a simple meal and stimulating conversation.

He was responsible for bringing siblings to Penn State for advanced study, two brothers (Prodipto and Shunil) who together with Rustum, Della, and, later, son Ronnen, brought to five the number of Roy Ph.D.s from Penn State. He also assisted on bringing three sisters, Sita, Asoka (Koko), and Dipti for advanced study in the United States in their medical professions. Other siblings—Ayesha, Ronobir, Protap, and

Roma—visited the United States from time to time. The next generation of nieces and nephews helped nucleate an extended Roy clan in this country and abroad.

Rustum was born the seventh child (of 11) to Narendra Kumar and Rajkumari Roy. He is survived by his wife Della Martin Roy and sister Dipti Ioni Sisodia; sisters-in-law Krishna Roy, Joyce Roy, Sheila Roy, and Joya Chowdhury Roy; sons Neill R. Roy, Ronnen A. Roy, and Jeremy R. Roy; daughters-in-law Evelina Francis, Sinaly Munoz, and Lydia Bufanda; and granddaughter Simone D. Roy and grandson Naren S. Roy.