

Fred Basolo — 70th Birthday Dedication



This year Fred Basolo becomes Charles E. and Emma H. Morrison Professor Emeritus and is appointed senior scientist at Northwestern University. In effect this removes only one of his functions, teaching. Fred is well known for his pioneering research on the mechanisms of inorganic reactions and for his successful efforts to raise the level and stature of inorganic chemistry in the U.S.A. In the first part of this century inorganic chemistry did not develop in the U.S.A. at a pace comparable to that in Europe. Therefore the renaissance in inorganic chemistry, which commenced worldwide in the 1950s, had a much thinner base in the U.S.A. than elsewhere. Fred Basolo was one of a few inorganic chemists in the 1950s and early 1960s who developed the subject in the U.S.A.

Basolo's early research with Pearson on mechanisms of substitution reactions of Werner complexes put mechanistic coordination chemistry on a sound footing. Among their important early findings were

the clear demonstration of the conjugate base mechanism for ligand substitution reactions of cobalt amine complexes, and the demonstration of the role of steric factors in substitution of square planar complexes. He studied mechanisms of reactions with an eye toward their use in the syntheses of new metal complexes or the syntheses of known compounds by new methods. This is perhaps best illustrated by his design of the syntheses of new linkage isomers of nitrito-nitro metal complexes, and the preparation of the first thiocyanato-isothiocyanato isomers of metal complexes. Thus he illustrated to inorganic chemists that the knowledge of mechanisms of reactions can be useful in preparative coordination chemistry. This idea is now ingrained in the way many inorganic chemists think.

His research on Werner complexes was followed by studies on mechanistic organometallic chemistry. A major achievement in this research was the concept that ligand-metal valence reorganization may dramatically increase associative ligand substitution processes. Specifically, slippage of the cyclopentadienyl ligand and bending of the M-NO link were implicated as facilitating associative ligand substitution reactions. This concept is now very widely invoked in inorganic and organometallic chemistry.

Although he is most widely recognized as a mechanistic chemist, Basolo has had longstanding interests in other areas of inorganic chemistry. For example, Fred and coworkers, demonstrated that synthetic reversible oxygen carriers could be achieved by utilizing low temperatures to avoid the irreversible oxidation reaction. They also demonstrated reversible oxygen binding for metal porphyrins supported on surfaces where the bimolecular oxidation process is suppressed. The application of mechanistic concepts in preparative inorganic chemistry was mentioned above. Fred Basolo's interest in synthesis led him to edit a volume of *Inorganic Syntheses* and to serve as president of the organization that produces *Inorganic Syntheses*.

In addition to seminal research papers, Fred Basolo has written important books for research workers and students. The publication of Basolo and Pearson's highly influential book in 1958 *Mechanisms of Inorganic Reactions*, provided a systematic and modern view of the subject. This book helped to spark the mechanistic investigation of complexes, and introduced the use of ligand field theory to systematize

the mechanisms of metal substitution reactions. A book with a former student, Ronald Johnson, has introduced three decades of fresh students to modern coordination chemistry.

One early boost for inorganic chemistry was the founding of the Gordon Research Conference on Inorganic Chemistry in the early 1950s which Fred and a small group of colleagues helped to establish. For many years these conferences served as the main focal point for inorganic chemistry in the U.S.A. Despite the great increase in meetings on various aspects of inorganic chemistry, the annual Inorganic Gordon Conference continues to be a stimulating arena for inorganic chemistry. Although Fred Basolo has been very influential in the development of inorganic chemistry in the U.S.A. his scope is international. He spent an academic year in 1954–55 with Professor Janick Bjerrum in Copenhagen; 1961–62 with Professor Vincenzo Caglioti in Rome and he has had extended stays in many countries, including F.R.G. and China. In the mid 1960s a formal exchange program between E. O. Fischer's laboratory in Munich and Fred Basolo's in Evanston provided graduate students from the U.S.A. and F.R.G. with a stimulating combination of mechanistic and synthetic chemistry.

Many prominent inorganic chemists have been either students or postdoctorals in Fred Basolo's laboratory. Among the former students who have become university professors are Robert Angelici, James Beattie, John Burmeister, Irwin Cohen, Allen Crumbless, Harry Gray, Patrick Henry, Ronald Johnson, Joseph Kolis, Marvin Lofquist, Kent Murmann, Kenneth Raymond, James Reed, Thomas Richmond, Peter Sheridan and Andrew Wojcicki.

Fred Basolo also has served his profession as both member of the Board of Trustees of the Gordon Research Conferences and as Chairman of that board in 1976. He was Chairman of the Chemistry Section of the American Association for the Advancement of Science in 1970 and President of the American Chemical Society in 1983.

Fred Basolo's honors include a Guggenheim Fellowship, the ACS Award in Inorganic Chemistry, the ACS Award for Distinguished Service in Inorganic Chemistry, the Bailar Medal, and the Dwyer Medal. He is a member of the U.S. National Academy of Science, American Academy of Arts and Sciences, and the National Academy of Science (Lincei) of Italy. He received an Honorary Degree from the University of Southern Illinois, was named *Laurea Honoris Causa* by the University of Turin, he received the IX Century Medal from the University of Bologna and he was appointed Honorary Professor at Lanzhou and Zhongshan Universities.

Although Fred Basolo's influence and reputation have extended throughout the globe he has spent most of his life in one State, an unusual situation for an academic in the U.S.A. He was born in 1920 in southern Illinois, educated there and at the University of Illinois in central Illinois (Ph.D. 1943) and he rose through the professorial ranks at Northwestern University in northern Illinois. The Governor of Illinois proclaimed August 17, 1990 as Fred Basolo day, to coincide with a celebration at Northwestern University of Fred Basolo's achievements. Characteristically, this was attended by former coworkers from around the globe.

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