
Edward I. Stiefel

Ralph W. Dornste Lecturer with the rank of Professor of Chemistry
Ph. D., Columbia University, 1967



Research Interests

Stiefel's research interests involve the bioinorganic, coordination, and environmental chemistry of transition metal ions. He is interested in the roles played by "trace" elements such as iron, molybdenum, and tungsten in the biogeochemical cycles of the major elements, such as carbon, nitrogen, and sulfur. Particular interests involve nitrogen fixation, the molybdenum cofactor, and the role of metalloenzymes and catalysts in the origins and evolution of life. Stiefel is also involved in the bioinorganic chemistry of iron, and the role of ferritin and bacterioferritin (which he co-discovered) in the storage, sequestration, and delivery of iron for cellular processes. In collaboration with François Morel, he studies marine organisms, where the nature of iron storage is virtually unknown (although iron is a limiting nutrient in certain ocean environments, and iron fertilization has been proposed as a possible CO₂ mitigation strategy). For bacterioferritins, which contain heme, there is great interest in the (yet unknown) mechanism of internal electron transfer, which may facilitate the uptake and release of iron.

Prior to coming to Princeton, Stiefel was a Senior Scientific Advisor at ExxonMobil Corporate Strategic Research and a Senior Investigator at the Charles F. Kettering Research Laboratory. He is on the Board of Reviewing Editors of *Science*, a Fellow of the American Association for the Advancement of Science, and winner of the American Chemical Society Award in Inorganic Chemistry for the year 2000. He is the founding co-chair (with François Morel) of the Inaugural Gordon Research Conference on Environmental Bioinorganic Chemistry (June 2002).

Courses

CHM/ENV 544: Metals in Biology

FRS 153: Elements of Life

Selected Publications

Stiefel, E.I., ed. 2004. Dithiolene chemistry: Synthesis, properties, and applications. In *Progress in Inorganic Chemistry*, 52:1-738. New York: John Wiley and Sons.

Stiefel, E.I. 2002. The biogeochemistry of molybdenum and Tungsten. In *Molybdenum and Tungsten: Their Roles in Biological Processes, Metal Ions in Biological Systems*, edited by A. Sigel and H. Sigel, 39:1-30. New York: Marcel Dekker.

Stiefel, E.I., and H.H. Murray. 2002. Molybdenum in the environment. In *Heavy Metals in the Environment*, edited by B. Sarkar, 503-529. New York: Marcel Dekker.

Wang, K, and E.I. Stiefel. 2001. Toward separation and purification of olefins using dithiolene complexes: An electrochemical approach. *Science* 291:106-109.

Adams, M.W.W., and E.I. Stiefel. 2000. Organometallic iron? Key to biological hydrogen metabolism. *Current Opinion in Chemical Biology* 4:214-220.

Stiefel, E.I. 1998. Transition metal sulfur chemistry and its relevance to molybdenum and tungsten enzymes. *Pure Appl. Chem.* 70(4):889-896.

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