

## VIRENDER K. SHARMA

Department of Chemistry, Florida Institute of Technology

**NATIONALITY:** USA

### EDUCATION

- 1989 Rosenstiel School of Marine and Atmospheric Sciences, University of Miami, Florida. Ph.D., Marine and Atmospheric Chemistry.
- 1984 Indian Institute of Technology, New Delhi, India. M. Tech., Modern Methods of Chemical Analysis and Control.
- 1982 University of Delhi, Delhi, India. M.Sc., Physical Chemistry.
- 1980 University of Delhi, Delhi, India. B.Sc (Honors), Chemistry.

### WORK EXPERIENCE

- 1999-Present *Associate Professor of Chemistry* at Florida Inst. of Technology, Melbourne, FL
- 1997-1999 *Associate Professor of Chemistry* at Texas A&M University-Corpus Christi, TX
- 1992-1997 *Assistant Professor of Chemistry* at Texas A&M University-Corpus Christi, TX
- Summer, 1992 *Visiting Faculty:* "Fundamentals of Chemistry," Drury College, Springfield, MO
- Summer, 1991 *Visiting Faculty:* "Fate of pollutants in the Aquatic Environment" at Instituto De Ciencias Del Mar Y Limnologia, UNAM, Mexico City, Mexico.
- 1989-1990 *Lecturer I:* Millard Fillmore College, affiliated with S.U.N.Y at Buffalo, NY
- 1985-1989 *Graduate Research Assistant* at RSMAS, University of Miami, FL
- 1986-1989 *Teaching Assistant:* graduate and undergraduate Chemical Oceanographic laboratories (MAC 504 and MSC 216) at University of Miami, FL

### SELECTED HONORS/AWARDS

- Secretary - American Chemical Society (Geochemistry Division), 2000-2002.
- Guest Editor - "Marine Chemistry" special issue vol. 71, 2000.
- Session Chair - "Specialty Chemicals in the Environment" symposium (Environmental Chemistry Division) at the Spring 2000 ACS meeting in San Francisco, California, 2000.
- Symposium Organizer Award - The best ACS (Geochemistry Division) symposium "Thermodynamics and Kinetics in Natural Waters" in honor of Frank Millero for 1999.
- Member - Risk management plan third party review for port industries of Corpus Christi, 1998.
- Certificate of Merit - American Chemical Society (Division of Environmental Chemistry), for presentation entitled "Oxidation of Thiourea by Ferrate(VI)" at Orlando, FL, 1996.

### INTERNATIONAL COLLABORATION

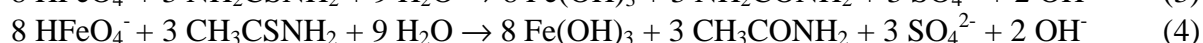
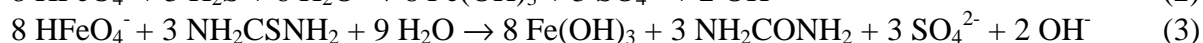
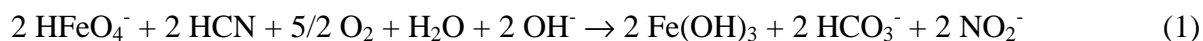
We collaborate extensively with Dr. Felipe Vazquez, a marine chemist from the Universidad Nacional Autonoma de Mexico (UMAN), Mexico to study the bio-geological chemistry of contaminant metals and hydrocarbons in southern Gulf of Mexico. We also work with Dr. R. Balasubramanian at the National University of Singapore on the kinetics and mechanism of reactions in environmental aquatic chemistry.

### SELECTED RECENT PUBLICATIONS (Total 58 in referred journals)

1. V.K. Sharma, "Potassium ferrate(VI): An Environmentally Friendly Oxidant" *Adv. Environ. Res.*, In Press (2000).
2. F.G. Vázquez, B.R. Rangel, M.A. Mendoza-Quintero, P.J. Fernández, C.E. Aguayo, P.A. Palacio, and V.K. Sharma, "Southern Gulf of Mexico" *In: Seas at the Millennium: An Environmental Evaluation* (Ed. C. Sheppard), (2000).

3. V.K. Sharma, S. Hicks, W. Rivera, and F.G. Vazquez, "Hydrocarbons in sediments of Nueces Bay, Texas" *Bull. Environ. Contam. Toxicol.*, 65, 253 (2000).
4. V.K. Sharma, R.A. Rendon, F.J. Millero and F. G Vazquez, "Oxidation of thioacetamide by Fe(VI)" *Mar. Chem.*, 70, 235 (2000).
5. V.K. Sharma, K.B. Rhudy, R. Koenig, and F.G. Vazquez, "Metals in sediments of Upper Laguna sediments" *Mar. Pollut. Bull.*, 38, 1221 (1999).
6. V.K. Sharma, W. Rivera, V.N. Joshi, F.J. Millero, and D. O'Connor, "Ferrate(VI) Oxidation of thiourea" *Environ. Sci. Technol.*, 33, 2645 (1999).
7. F.G. Vazquez, V. K. Sharma, G. Erisco, J. W. Morales, S.L. Nischt, G.L. Domingo, "Metal ions in water and sediments of Pom-Atasta lagoon, Mexico" *Environ. Int.*, 25, 599 (1999).
8. K.B. Rhudy, V.K. Sharma, R.L. Lehman and D. Mckey, "Seasonal variability of the Texas "brown tide" (*Aureobra lagunensis*) in relation to environmental parameters" *Estuarine Coastal Shelf Sci.*, 48, 565 (1999).
9. F.G. Vazquez, V.K. Sharma, V.R. Magallanes, and A.J. Marmolejo, "Heavy metals in a coastal lagoon of the Gulf of Mexico" *Mar. Pollut. Bull.*, 38, 479 (1999).
10. V.K. Sharma, W. Rivera, J.O. Smith and B. O'Brien, "Ferrate(VI) oxidation of aqueous cyanide" *Environ. Sci. Technol.*, 32, 2608 (1998).

**Proposed CUAP Research Area:** *Ferrate (VI): An Environmentally Friendly Oxidant for Removal of Contaminants in Aquatic Environments.* Ferrate(VI) (Fe(VI)) has properties such as high stability, oxidizing power, selectivity, and a non-toxic by product, Fe(III), that make Fe(VI) an environmentally friendly oxidant for natural waters. Fe(VI) has therefore a role in environmental and industrial removal of contaminants. In our laboratory, we have initiated the studies on the rates, stoichiometry, and products of the Fe(VI) oxidation of nitrogen- and sulfur-containing contaminants in the aquatic environment. Fe(VI) oxidizes contaminants to less harmful products in the aquatic environment in seconds to minutes (eqs 1-4). This suggests the potential of potassium ferrate(VI) as a chemical oxidant for the destruction of contaminants in wastewater effluents.



Presently, our focus is on the use of ferrate(VI) in removing cyanides from wastewater effluents. The laboratory experiments on the use of ferrate(VI) in removing cyanides (free and complexes) from rinse water and gold mill wastewater were successful. This indicates that ferrate(VI) has the potential to serve as a reliable and safe oxidative treatment for removing cyanides in wastewater effluents such as those encountered in Hungary.

The studies on the Ferrate(V) (Fe(V)) have also been initiated. Fe(V) has been shown to be a more powerful oxidant than Fe(VI) and reacts with compounds 3-5 orders of magnitude faster than Fe(VI). The oxidation of contaminants by Fe(VI) can be in principle significantly accelerated by addition of an effective reducing agent which convert Fe(VI) to Fe(V). The enhancement of contaminant removal by Fe(VI) is being explored by using radiation technique.

*Principal Investigator:* V. Sharma (Florida Tech); BUTE collaborator TBD.

*First year project costs* for travel and subsistence: \$4,000

*Second year project costs* for travel and subsistence: \$3,500

*Third year project costs* for travel and subsistence: \$3,500