



"The Art of Atmospheric Infrared Measurements"

Dr. William Fateley
Kansas State University

Date: April 26, 2000, Wednesday
Time: 7:30 PM
Place: Library Building, Room L-102.
Columbia Basin College, Pasco, WA

Abstract: The mobile Fourier transform infrared spectroscopy system at Kansas State University has proven its capabilities in the analysis of volatile organic compounds in the atmosphere. The project is now entering the stage of development where modifications to the system are being made. These modifications are designed to better the results of the field work that is being done and are a direct consequence of the preliminary testing that was performed with the system. This presentation will outline modifications to both the instrument and optical arrangement of the system. The optical arrangement that has been used is the single pass of a 20-inch beam of collimated radiation through the desired sampling area. The modification to be described here is the addition of a 14-inch gold plated reflecting optic. In the new arrangement, the instrument and source telescope will be positioned on the same end of the sampling area, with the reflection optic placed on the opposite side of the sampling area. The collimated beam of infrared radiation will travel from the telescope side to the 14 inch reflecting mirror (pass 1) and back to the instrument (pass 2). This addition allows for easier deployment of the system, more hostile environments to be sampled, and lower detection limits per compound due to the infrared radiation passing through the desired

sampling area twice. The modifications themselves along with experimental data will be discussed in this presentation. The use of the measurement for oil refineries landfills, industrial areas, and water treatment plants will be presented.

About the Speaker: William G. Fateley received an A.B. degree from Franklin College in 1951 and a Ph.D. from Kansas State University in 1955. He joined the faculty of Kansas State University in 1972, where he currently is University Distinguished Professor in the Department of Chemistry. He was editor-in-chief of the Journal Applied Spectroscopy (1974-94), the associate editor of Applied Spectroscopy (1968-74), and Editor of Raman Newsletter (1975-80). He has received the following honors and awards: Phi Beta Kappa (1976), Distinguished Graduate Faculty Member, Kansas State University (1974), William F. Meggers Award (1988), SAE Highest Award Science (1990), Honorary Membership in the Council for Near-Infrared Spectroscopy (1990), and Sigma Xi Research Award (1991), U.S. Army Award for SAFEGUARD Leadership (July 1999).

Prior to the meeting, an open dinner with the speaker is planned at 5:30 PM at the Vineyards Steakhouse at the Pasco Double Tree Hotel. If you wish to have dinner with the speaker, please call Brian Rapko at 376-1571 or e-mail: brian.rapko@pnl.gov.

May Newsletter

We are not planning a May newsletter. So the May meeting is include in this edition. Please keep this issue for information for the LIGO tour.

May Meeting: "Tour of LIGO"

Date: May 16, 2000, Tuesday

Time: 4:00 PM

Place: LIGO Facility – We will meet at the LIGO Facility

Place: Meet at the LIGO front gate.

A voluntary contribution of \$5 per person is requested on the 16th to cover the Richland Section's cost for sandwiches.

Directions: The most straightforward way to get to LIGO is to drive to Richland along I-182 (a.k.a. I-12, East of the Tri-Cities; the same road becomes I-82 West of the Tri-Cities), then take Route 240 North to the Hanford Nuclear Reservation and then take Stevens Way to Route 10. Route 240 will turn to the left at this traffic light. Proceed straight ahead in the direction marked "Hanford." Note the speed limit changes from 55 mph to 35 mph at this point! Once through the light, this road will bend toward the left and is now signed as "Stevens Way." In about a mile, you will pass most of the driveways into warehouses, shops and offices and the speed limit will return to 55 mph. (NOTE: Although the road is wide, arrow-straight, with few turnoffs and with visibility ranging several miles, the speed limit is what it is and IT IS VIGOROUSLY ENFORCED!) Drive about 13 miles (will pass FFTF and WPPS) to the intersection with Route 10 (Do not go through the guarded barricade). Turn left onto Route 10 and take it approximately 1-1/2 miles to the LIGO access road on your right.

Background: The LIGO acronym stands for Laser Interferometer Gravitational-Wave Observatory, whose mission is to observe gravitational waves of cosmic origin. LIGO will search for gravitational waves created in the supernova collapse of stellar cores to form neutron stars or black holes, the collisions and coalescences of neutron stars or black holes, the wobbly rotation of neutron stars with deformed crusts and the remnants of gravitational radiation created by the birth of the universe. LIGO is a joint project of scientists at the California Institute of Technology (Caltech) and the Massachusetts Institute of Technology (MIT), sponsored by the National Science Foundation (NSF).

Construction of buildings and vacuum systems has been completed at the two LIGO observatory facilities in Hanford, WA and Livingston, LA. Each facility will house laser interferometers, consisting of mirrors suspended at each of the corners of a gigantic L-shaped vacuum system, measuring 4 kilometers (2-1/2 miles) on a side. Precision laser beams in the interferometers will sense small motions of the mirrors that are caused by a gravitational wave. Installation of these interferometers is now under way.

Gravitational waves that originated hundreds of millions of lights years from earth are expected to distort the 4-kilometers mirror spacing by about a thousandth of a fermi, less than one tenth of a trillionth of the diameter of a human hair. Einstein's Theory of General Relativity first predicted these waves in 1916, but the technology to make their detection did not exist. Now at the turn of this century, we believe the technology to make detection is at hand.

RSVP: If you wish to attend the tour, please contact Brian Rapko at Brian.Rapko@pnl.gov or at (509) 376-1571 on or before May 10, 2000.

Electronic Mailing

We can realize a considerable cost saving by e-mailing the newsletter. If you are willing to receive your newsletter by e-mail, please contact Therese Clauss, 376-8051, e-mail at therese.clauss@pnl.gov. You can also view the current monthly newsletter on the Richland ACS Homepage at <http://www.pnl.gov/acs/>

Depot Tour Great Success

Forty Richland Section members and their guests toured the Army's Umatilla Chemical Depot on Tuesday evening, March 21st. The Depot, one of eight U.S. Army installations in the continental U.S. where lethal chemical munitions are stored, is located in Oregon, on the county line between Morrow and Umatilla counties. The purpose of the tour was to acquaint members with the chemistry and technical issues surrounding incineration of chemical warfare agents.

After being met by Mary Binder of the Depot staff and the Depot Commander, Lieutenant Colonel Woloszyn, our group took a bus out to the incinerator site, where we toured the analytical lab. The lab, which is operated by Southwest Research Institute, is responsible for environmental monitoring around the incinerator, as well as monitoring the process chemistry in the incinerator. Additional areas visited were a storage "Igloo", mobile analytical lab, and Depot Operations Center. A very enjoyable and informative tour finished up with a submarine sandwich dinner and a chance to meet one-on-one with LTC Woloszyn.



Richland Members Touring the Analytical Laboratory at the Depot

Richland Section Judges Science Exhibits

Ten Section members turned out on Thursday afternoon, March 16th to judge chemistry related projects at the science fair held at Columbia Center Mall. In the senior level our section awarded a Merck Index to Sumona Das Gupta for her project on phytoremediation of TNT contaminated water. This project was partially based on work she did last summer with the Army Corps of Engineers. Austin Chick, the junior division winner, was awarded a CRC Handbook for his project. "What Affects the Burn Rate of Black Powder?" Giving of their time and talents to make the science fair a success were: Royace Aikin, Heather Anastos, Sam Bryan, Lee Burger, Therese Clauss, Beverly Crawford, Greg Eiden, Tim Hubler, George

Klinger, and Steve Krogsrud. All the volunteers agreed that judging was a great experience

1964 Chair Bert Keder

Bert Keder (Dr, Wilbert E Keder), our Section 1964 Chair, died Mar 23. He had been living in Colorado Springs since his retirement from teaching. He was in my group when I had the old Chemical Research Section out in the 325 Bldg. The paper called him an analytical chemist, but he was actually a physical chemist, and a good one. He had been suffering from MS for several years.

Lee Burger

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