

(see above). I highly recommend signing up as a participant, and planning for 40-50 messages a day. I would strongly suggest planning some way of having your system automatically sort incoming mail — Eudora or its equivalent. If you don't have e-mail yet this may be a good opportunity to use this conference as I did to get connected to Internet. I've heard over a million new users are signing up every month. For those of us who usually can't make it to national meetings, this is an interesting way to be part of a conference. If you have any suggestions about topics you'd like to have covered, tell Don Rosenthal or Tom O'Haver.

SOFTWARE REVIEW: IR TUTOR, version 1.0 by Charles B. Abrams

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The Perkin-Elmer Corporation (Mail Station 12, 761 Main Ave., Norwalk, CT 06856-9966) has recently released a program called IR TUTOR as part of their 1600 Series FT-IR educational package. The entire package is listed at \$2,000 but the price is reduced to \$500 for purchasers of Perkin-Elmer IRs. I tested a pre-release copy of IR TUTOR the past summer in the second semester of introductory organic chemistry, and found the program to be a superb introduction to infrared spectroscopy. Not only did the students really enjoy using it, but what is more important, they learned how to interpret IR spectra. Twenty students had four unknowns each, and all of the IR spectra which they ran were interpreted correctly. The unknowns were taken from a much larger list of

unknowns of varying difficulty that we have been using for some time. The students received no other training on IR spectroscopy except that which they got during exams.

The most striking feature of IR TUTOR is the animations of the bond vibrations that cause peaks in the IR spectra. Once you see these, you will never be happy with any other way of teaching about bond vibrations. The other animations are outstanding, particularly the illustration of light as a wave and the graphics that combined a graph of the energy with the state of the molecular vibration. The animated diagrams of different types of IR instruments were also excellent. The best way I can describe the quality of the program is to state this is what CAI will be like ten years from now.

The most useful feature of IR TUTOR is the ability to overlay two spectra and compare them, which allows an easy correlation of peaks with functional groups. This is a very useful teaching tool, and the program takes advantage of it. The program allows the user to select a peak, like one which might be apparent from the difference between two overlaid spectra; when the peak is selected, the program will display the vibration responsible for that peak.

The only problem I found with the program was that you could not enter spectra into it. The author has informed me that the next version will allow the import of spectra from the P-E 1600 IR. The next version will also include an interactive, animated, correlation table and more theory, including a detailed explanation of the Fourier transform.

IR TUTOR could be used in the lecture part of a course, as a part of the lab, or as an independent assignment. Students seem to need from two to two and a half hours to finish the program. Students who have had no microcomputer experi-

ence are able to complete the program without help in running it. I am fortunate to have access to a lab with ten Mac Quadras, to which I assigned students in pairs; while I walked around the room commenting, teaching, or looking for students with problems running the program. (There weren't any.) IR TUTOR could be used with a single projection TV in a classroom. I did use it with an expensive LCD panel projector, but I wonder if it would work satisfactorily with the less expensive LCDs, because of problems in displaying the animated bond vibrations.

IR TUTOR comes in versions for both the Macintosh, (SE II Series, LC II, Powerbook 180, Quadra, Performa) and IBM PC or clone under Windows. A color monitor is desirable. The Mac and IBM versions look identical if the PC monitor is set to 256 colors. The author of the program used a very interesting way to produce the Mac and IBM versions essentially at the same time. (Macromind Director and Windows Player from Macromedia, 600 Townsend St., San Francisco, CA 94103). This system produces really superb CAI, with spectacular animations.

Rumor at the Chicago ACS Meeting was that Perkin-Elmer would accept the serial number of a Perkin-Elmer IR as sufficient evidence to get the discount.

An outline of the program follows:

- I. Introduction to Spectroscopy
 - A. Definition of Spectroscopy
 - B. Nature of Light
 - C. Measurement of an Infrared Spectrum
- II. Theory of Infrared Spectroscopy
 - A. Classical Model of a Molecule
 - B. Quantum Mechanical Model of

a Molecule

C. Normal Modes and Group Frequencies

III. Interpretation of Spectra

A. Hexane

B. Dimethyl Butanes

1. 2-methyl-1-butene

2. 2-methyl-2-butene

C. 1-Hexene

1. trans-2-hexene

D. 1-Heptyne

E. Heptyl Cyanide

F. Toluene

1. o-xylene

2. m-xylene

3. p-xylene

G. Hexanol

1. 2-propanol

2. 2-methyl-2-butanol

H. Hexyl Amine

1. dibutyl amine

2. tributyl amine

I. Heptyl Aldehyde

J. 3-Heptanone

K. Heptanoic Acid

L. Ethyl Acetate

M. Butyric Anhydride

THE ON-LINE COMPUTER CONFERENCE

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INTRODUCTION

An article on computer conferencing appeared in the Fall 1992 issue of this Newsletter (p. 24 to 26). The Spring 1993 issue of the Newsletter (p. 10 to 13) described the results of the February trial session. In this article the on-line conference on "Applications of Technology in Teaching Chemistry" will be briefly described, and the participant responses to the questions on an evaluation form will be summarized.

PRE-CONFERENCE ACTIVITIES

The Conference was publicized at the 12th Biennial Conference on Chemical Education at the University of California - Davis during the summer of 1992. Announcements were sent out via the Chemistry Education Discussion List (CHEMED-L) and other computer discussion lists. An announcement appeared in the Fall 1992 issue of this Newsletter (p. 3). An article on the Conference was in the February 15 issue of Chemical and Engineering News (p. 25).

Titles of papers and abstracts were requested by February 1, 1993 and the full papers were expected to be sent to Thomas O'Haver (conference manager) by May 1. Registration via e-mail occurred mostly between October 1, 1992 and June 1, 1993. The number of participants varied with new registrants signing on and some registrants signing off

during the period of the conference. There were about 450 registrants from 33 countries. 74 % of the registrants were from the United States and 26 % were from other countries.

THE ON-LINE CONFERENCE - June 14 to August 20, 1993

The on-line Conference consisted of three sessions. The duration of each session was three weeks and five papers were presented in each session. A week was devoted to evaluation and general discussion at the end of the Conference. Most of the papers were available on June 14 - the first day of the Conference. During the first week of each session, participants were expected to read the five papers in the session and publicly ask short questions of the authors or other participants.

Participants wishing to call attention to typographical or other errors were asked to communicate with the authors privately rather than publicly. For each paper one day during the first week of the session was devoted to short questions. Discussion of the papers did not begin until the second week. Authors and participants had at least a week to prepare responses to the short questions. The authors of papers had been asked to include a few short questions to participants at the end of their papers. These short questions were designed to promote and focus discussion. Discussion of the papers occurred in the second and third weeks of the session. Two days were allocated for the discussion of each of the five papers. The weekends could be used for general discussion.

The fifteen papers which were presented (five per session) were:

1. The Use of Computers in a Junior-Level Analytical Chemistry - Physical Chemistry Laboratory Course
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