Simulation of the Physical Chemistry of Gas Chromatography

Advanced Chemistry Collection

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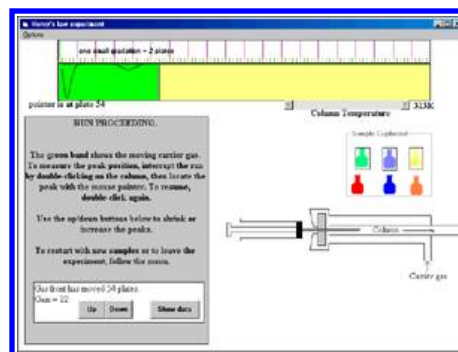
Simulation of the Physical Chemistry of Gas Chromatography, for Windows-compatible computers, was developed as part of a physical chemistry unit on phase equilibrium. It uses moving frames, theory text blocks, and a simulation of equipment. Its aim is to show how basic principles, based on Henry's law and the plate model, explain many of the features of gas chromatography.

A physical chemistry unit designed to serve an applied chemistry course must provide a simulation that works according to a specific physical model: the student should see how simple physical chemical principles lead to a good approximation of realistic behavior on the column. To implement this aim, rather than observing the emergence of the sample at the detector as a single event and measuring a single retention volume for each species, Simulation of the Physical Chemistry of Gas Chromatography allows the student to visualize the movement of a sample and the carrier gas front through the column and then to measure the position of peaks at successive times and column locations by means of a graduated scale. A series of retention volumes can be measured for each sample.

The equation relating the saturation vapor pressure, p^0, and the activity coefficient, g, to speed is given in the theory section, but students are only required to understand its import and not to be able to derive or even to memorize it.

A menu allows navigation between the sections of Simulation of the Physical Chemistry of Gas Chromatography. Experiments can be stopped and restarted easily. Many definitions and other technical points are available as hypertext. The student is encouraged to look quickly through the whole package, then to carefully work through the text and experiments.

This screen from Simulation of the Physical Chemistry of Gas Chromatography shows a Henry's law experiment in progress.