

ChemDemos II Videodisc: Abstract of Special Issue 14

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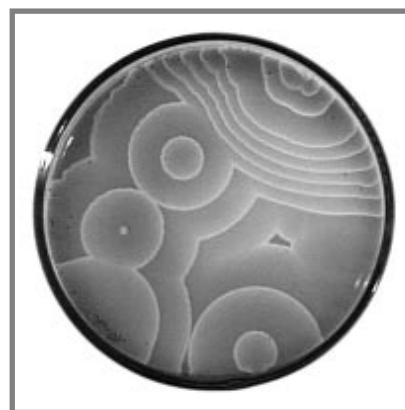
ChemDemos II is a laser videodisc that includes 39 demonstrations suitable for use in introductory chemistry classes either at the high school or college level. As in the original ChemDemos Videodisc (1) the emphasis is on the chemistry, with most demos shown close up, full screen. In only a few cases, where scale is important, can more than the demonstrators' hands be seen. Each demo has been selected because it illustrates an important aspect of chemistry, involves substances or equipment that are not available in many schools, and/or is hazardous or causes problems of disposal or cleanup. Some demos are brand new and not yet published; others are old standards, sometimes with a new twist. All are certain to stimulate students' curiosity and help them learn.

ChemDemos II includes a voice-over explanation of what is happening in each demo. Chemical formulas and equations are provided on screen whenever appropriate, and more complete explanations of the demonstrations, the principles they illustrate, and their practical applications are given in printed documentation. When important the sound of a demo is included. Examples include Conductimetric Titration and Piezoelectric Effect. The voice-over can be turned off so that teachers can provide their own descriptions, explanations, and discussions of each demo.

Several of the demos are accompanied by computer-generated animations that provide microscopic explanations of the macroscopic phenomena observed. Examples include Electrolysis, Peeling Layers of Molybdenum Disulfide, and Memory Metal.

Several of the demos illustrate processes that are of practical importance. Among these are the Cathode Ray Tube, utilized in TV and computer monitors, and Heat Treatment of a Metal Bobby Pin, which demonstrates the effects of the annealing and tempering processes.

Demos are grouped on the videodisc according to topic. Each demo can be accessed quickly and easily using a hand control for the videodisc player and the frame numbers included in the documentation. Barcodes are also



The Belousov-Zhabotinskii reaction, featured on the cover, oscillates in both time and space. It is a complex system involving bromate, bromide, malonic acid, sulfuric acid, ferroin indicator, and oxygen. The oscillations in this reaction start with the formation in a red solution of small blue dots that expand in ever-widening concentric rings.

provided in the documentation so that users with barcode readers have easy access to each demo. A text file that can be incorporated into *JCE: Software's* Videodisc Browser 2.0 for either Macintosh (2) or Windows (3) is included so that those with computer-controlled videodisc players can click on a demo's name to display it. The contents of the disc are listed below:

Side 1

Gases and Liquids

- Fluidity of Gases • Effusion of Gases • Gas Volume
- Boiling by Cooling • Critical Point of Benzene
- Viscosity of Liquids

Solid State

- Simulation of Dislocations in Metals • Heat Treatment of a Metal Bobby Pin • Heat Conduction by Diamond
- Hardness of Solid Substances • Piezoelectric Effect
- Superconductivity • Paramagnetism: Oxidation States of Manganese • Curie Point of Nickel • Ferromagnetic Fluid
- Thermochromism: Mercury(II) Iodide • Memory Metal

Rates of Reactions

- Thermodynamic vs. Kinetic Control: Forming HgI_2 • Temperature and Reaction Rate • Visible Intermediate: Tartrate + Peroxide • Autocatalysis: Permanganate + Oxalate • Iodine Clock Reaction • Oscillating Reaction: Briggs-Rauscher • Oscillating Reaction: Belousov-Zhabotinskii

Side 2

Electrochemistry

- Pulsating Electrochemical Reaction: Hg Beating Heart
- Oxidation States of Vanadium • Halogen/Halide Redox
- Electrochemical Series: Metal Trees • Overvoltage
- Metal/Iodine Reaction and Cells • Simulated Lead Storage Battery • Electrolysis of Water • Electrolysis of Aqueous Solutions • Cathode Ray Tubes
- Conductimetric Titration

Chemical Properties

- Chemical Properties of Sulfur Dioxide • Relative Reactivity of Alkali Metals • Sodium + Chlorine
- Potassium + Bromine

The reaction of sodium metal and chlorine gas to produce sodium chloride is initiated by the addition of a drop of water.



About This Issue

How to Use This Videodisc

ChemDemos II has been designed to address problems many teachers face in providing their students with views of important chemical reactions: safety, availability of substances and apparatus, and disposal of toxic or hazardous substances. The demonstrations on this disc have been selected because one or more of these problems is likely to prevent a teacher from doing the demo live. Thus the disc provides an important resource for first-year chemistry courses. Every demo on the disc illustrates at least one principle that is an important component of such a course and that might not otherwise be demonstrated.

ChemDemos II can be used stand alone with only a videodisc player and hand control or barcode reader for classroom presentations. If a videodisc player with a serial connection for a computer is available, demos can be shown even more easily under computer control using Videodisc Browser (2,3). Whether the disc is used stand alone or with a computer, students will see close-up views of each reaction, and a teacher can direct their attention to important observations as well as provide interpretations of what is seen. The laser videodisc medium allows immediate access to each demo, pausing, backing up, viewing in slow motion, repeating, and carefully examining what is happening.

The documentation provides information about each demonstration including topics for which the demo is suitable. For example, Effusion of Gases demonstration can be used in discussions of density, gas laws, molar mass, and pressure. The Critical Point of Benzene demonstration illustrates phase changes, physical properties, and states of matter.

ChemDemos II can also be used by students individually or in small groups. Using the printed documentation a teacher can prepare written materials that di-

rect students to view appropriate demos, make observations, and draw conclusions. This can be done using frame numbers and a hand control, with barcodes (barcodes in the documentation can be photocopied into locally produced materials for this purpose), or a computer lesson can be generated with Videodisc Browser if computer control is available.

The demos can also be built into computer-based materials developed by an individual teacher. Such materials can be created using HyperCard (4) on a Macintosh, ToolBook (5) under Windows on an IBM computer, or other such multimedia authoring systems. Such uses are allowed, even encouraged, provided they are noncommercial. Submission of multimedia presentations including video from ChemDemos II (or any *JCE: Software* videodisc) for publication in *JCE: Software* is also encouraged.

Hardware/Software Requirements

ChemDemos II is a 12-in, double-sided, 60-minute, CAV-type videodisc in NTSC format (it is incompatible with the PAL standard used in many European countries). It may be operated from any videodisc player using a handheld remote-control keypad or a barcode reader. (Consult the supplier of your videodisc player to ascertain whether it can be used with a barcode reader.)

To make the video presentation visible to students in a classroom either a large-screen color monitor or a color video projection unit with sound output is needed. The size of the monitor (or the need for a projection unit) depends on the size of the class to which the presentation will be made.

If the disc is to be used under computer control the videodisc player must have a serial (RS-232) interface. A text file for the videodisc compatible with Videodisc Browser 2.0 for both Macintosh and IBM compatible computers is included.

Acknowledgment

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Literature Cited

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3. Jacobsen, J. J. Videodisc Browser 2.0, *J. Chem. Educ.: Software*, **1996**, 3D, No. 2.
4. HyperCard, Apple Computer, Cupertino, CA 65014-2084.
5. ToolBook, Asymetrics Corp., Bellevue, WA 98004.

Ordering and Information

To Order This Videodisc

Journal of Chemical Education: Software (often called *JCE: Software*) is a publication of the *Journal of Chemical Education*. There is an Order Form inserted in this issue that provides prices and other ordering information. If this card is not available or if you need additional information, contact: JCE: Software, University of Wisconsin-Madison, 1101 University Avenue, Madison, WI 53706-1396; Phone: 608/262-5153 or 1-800-991-5534; FAX: 608/265-8094; Email: jcesoft@chem.wisc.edu.