

## Report



## Periodic Table Live! Excites Students

by Laura E. Slocum and John W. Moore

Periodic Table Live! is *not* just any periodic-table database. Yes, it does allow you to find lots of information about each element: its history, its reactions, its properties, its uses, and what it looks like. So do most of the periodic tables on the Web. What is it that makes Periodic Table Live! (PTL!) so special?

### Special Features

PTL! has several interactive features that set it apart (1). There are videos showing the reactions of many elements with air, water, acids, and base. As one middle-school teacher told us, if students want to see something blow up, they can go to PTL! and watch sodium react with concentrated acids; then they can look for videos of other reactive elements and perhaps pick up on patterns of reactivity. The teacher need not worry that the students will blow themselves up.

For each element there is an interactive solid-state structure that students can manipulate with a mouse to see it from all angles. There is also a large collection of physical and atomic-scale properties; data were obtained from trusted sources and there is a definition of each property (such as ionization energy or ionic radius) and a reference to the source of the data. Especially valuable, both for classroom presentation and student exploration, is the Chart/Sort module. It allows any numeric property to be graphed against any other numeric property for all of the elements or for a single group or a single period. The data are tabulated and can be sorted also.

### Teaching Experiences

Most important of all is the fact that students can contribute to PTL! The descriptions of the elements and the historical vignettes about scientists who discovered elements are in a wiki. Thus anyone, including students, can contribute to PTL!'s repository of information. One of us (LES) discovered how important this was during the 2007–2008 academic year when her high school students explored PTL! as part of a Project Tomorrow research project (2). The National Science Digital Library (NSDL) enlisted Project Tomorrow to ask teachers to select and use ten different areas of the NSDL (3). The teachers directed their students to each area through various assignments of the teachers' choosing. Project Tomorrow then surveyed students and teachers to ascertain their reactions to the NSDL materials.

One of us asked her students to use Periodic Table Live! to investigate various elements. These students had used several other online periodic tables prior to the assignment, but more than 85% of them ranked PTL! the "best Web site out there." *Why?* "You can send them information not on their site and if they post it for that element, they will give you credit for submitting it to them." Students really liked the idea that they might be able to investigate something and contribute to a larger, apparently adult, enterprise. Another student said, "You mean I could know something they do not know, really? I am looking for something and sending it to them." Rest assured, the student was encouraged to do just that.

The screenshot shows the 'Periodic Table Live!' interface for the element Strontium (Sr). At the top left is a small periodic table. The main content area is titled 'Strontium' and includes a video player showing a bright red flame. To the right of the video, there is text describing Strontium: 'The element is a metal in Group (IIA) - the alkaline earth metals - in the 5th period. Other elements in this group are beryllium (Be), magnesium (Mg), calcium (Ca), barium (Ba), and radium (Ra). Strontium was isolated by Davy in 1808, and named for a town in Scotland. The element is found chiefly as the sulfate, SrSO<sub>4</sub>, in the mineral celestite. Freshly cut strontium has a silvery appearance, but rapidly turns yellow due to oxidation to the oxide, SrO. It burns in air with a characteristic red flame. Strontium reacts rapidly with acids.' Navigation tabs for 'Description', 'Physical', and 'Atomic' are visible.

Figure 1. Periodic Table Live! page for strontium. Video shows the reaction of strontium with air and the characteristic red flame.

The other co-author (JWM) has found similar enthusiasm in his college-level courses. A student in a first-year, accelerated, general chemistry course chose a project that involved adding information to the PTL! The student found on the Web copyright-free line spectra for all of the elements and added these to the wiki. Students in an inorganic course were assigned to investigate an element of their choice and to write reports on various aspects of that element's chemistry and on its importance to society. Students approached these assignments with enthusiasm and their reports were well done, probably as a result of the fact that others than just the teacher would ultimately read their reports.

Periodic Table Live! is *not* just an online periodic table. It is a harbinger for a new approach to enabling students to learn.

### Literature Cited (all sites accessed Jul 2009)

1. Periodic Table Live! <http://www.chemeddl.org/collections/ptl/index.html>.
2. Project Tomorrow. <http://www.tomorrow.org/index.html>; Project Tomorrow's 2008 survey report is at [http://www.tomorrow.org/docs/SU08\\_selected%20national\\_findings\\_complete.pdf](http://www.tomorrow.org/docs/SU08_selected%20national_findings_complete.pdf).
3. National Science Digital Library. <http://nsdl.org/>.

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