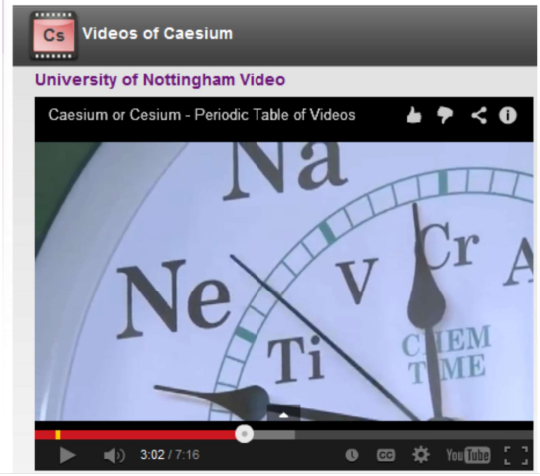




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Opinion piece

# The periodic table: icon and inspiration

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One contribution of 18 to a discussion meeting issue 'The new chemistry of the elements'.

**Subject Areas:** inorganic chemistry

**Keywords:** endangered elements, superheavy elements, YouTube, Periodic Videos

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To start this discussion meeting on the new chemistr of the elements held on 12 May 2014, Marty Poliakoff, Foreign Secretary of the Royal Society, wa invited to give the opening remarks. As a chemist an a presenter of the popular online video channel 'Th periodic table of videos', Martyn communicates hi personal and professional interest in the elements t the public, who in turn use these videos both as a educational resource and for entertainment purposes Ever since Mendeleev's first ideas for the periodi table were published in 1869, the table has continua to grow as new elements have been discovered, and i serves as both icon and inspiration; its form is now s well established that it is recognized the world over a a symbol for science. This paper highlights but a fe of the varied forms that the table can take, such as a infographic, which can convey the shortage of certai elements with great impact.

*Compare and contrast the chemistry of manganese a chlorine.*[1] My generation of chemists was plagued such questions which were inspired by the A/B labelli of the groups in the periodic table; for Europea Mn was in group VIIA and Cl in group VIIB, s figure 1, whereas the labels were confusingly revers in the USA. I still find it hard to believe that su chemical comparisons ever led to new scientific insig Fortunately, younger chemists such as my co-author Si Tang have been spared such questions by the ma logical numbering of the groups from 1 to 18, althou it is worth remembering that this renumbering initia caused consternation among chemistry teachers w believed that it would make the teaching of chemist much more difficult!

[1]For example, the elements can display the +7 oxidation state, example, in $[MnO_4]^-$ and $[ClO_4]^-$, both of which are oxidizing ag but permanganate is coloured and perchlorate is not.



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**Figure 6.** Clock devised by chemistry teacher Nagayasu Nawa at Kasume University Fusetsu High School, Japan. It is an excellent example of how an unusual form of the periodic table can highlight particular features, in this case atomic number [30]. * (Photo courtesy of N. Nawa.) (Online version in colour.)

in terms of their atomic weights. Sadly, Moseley's premature death at Gallipoli in 1915 prevented his winning the Nobel Prize for his outstanding achievement.

There is no single 'true' periodic table, although probably only the standard 'short form' is widely recognized by the general public. Unfortunately, the standard form does not make it easy to pick out the atomic number of a particular element without peering at the small print. By contrast, a recent 'atomic clock', designed by a Japanese schoolteacher makes the task very easy (figure 6). The clock exploits people's almost instinctive ability to convert a position on the clock face into a number of minutes, for example enabling one instantly to see that neodymium has atomic number 60. So different arrangements of the elements can serve different purposes; novel forms of the periodic table can be useful for highlighting particular aspects of the elements. Let us hope, however, that no examiner gets hold of the Japanese clock because it has no less than 58 different pairs of elements, each with the associated opportunity of forcing unwilling pupils to compare and contrast their chemistry!

In conclusion, we are here to discuss the new chemistry of the elements. It is clear that the periodic table has become an icon of our profession as chemists, easily recognized by most people. However, it has also become an important tool for our research, constantly reminding us that there is still so much chemistry to be discovered and luring us to explore the chemistry of the less popular elements. Surely their time will come, giving us quite unexpected new materials, catalysts and reactions. So do not hesitate. Go and explore!

*It has 118 atomic symbols—H to Uuo—on its dial in a double circle. Near the centre of the clock is a spiral line along which are written numbers that represent the electron configuration of each atom written on the outer circles. (Add 10, 20 or 28 to the number according to the colour index.) This clock was given as the prize to the winner of the finger-match games held in the chemistry room on 27 April 2014, when our school festival was held under the theme 'IUNKOHSUSAISHIN or do your best'. (The clock and mark MAG.T.O.HWA manufactured by NOA Co., Ltd©—N. Nawa.



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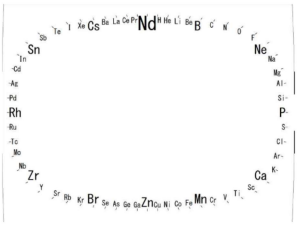

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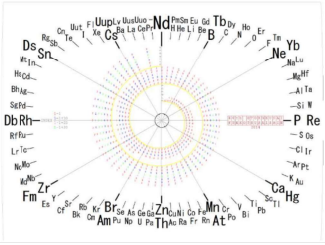



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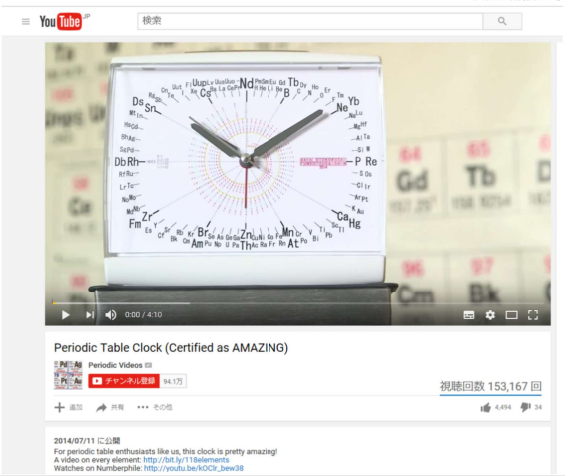




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