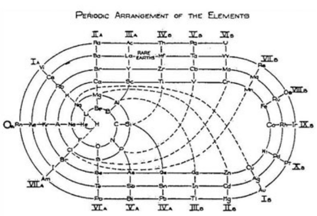
Shapes of the periodic table元素周期表的不同形式

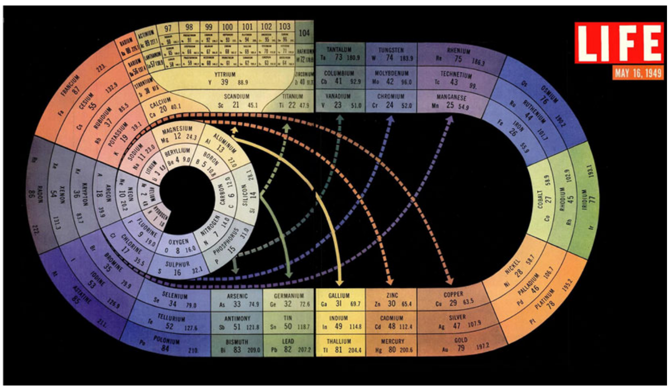
[Shapes of the periodic table - GalChimia](#)

The Race-Track Periodic Table (1933)

Chemist and sci-fi author John Clark created a race-track-like table in 1933 (left), whose nicely colored version became popular after LIFE magazine's issue on The Atom in 1945 (right). This irregular spiral is a systematic arrangement of the natural elements (further extended to element 104) by their number of electrons. The table is so neat that elements with similar properties appear grouped together in blocks or connected by solid arrows (see for example the inert gases on the left).

化学家、科幻小说作家John Clark于1933年设计了一种形似赛道的元素周期表（如左图）。1945年，该元素周期表的彩色版（如右图）在《生活》（*LIFE*）杂志关于“原子”的一期后流行一时。这一形状为不规则螺旋形的元素周期表是对不同种元素的系统性排列。这一元素周期表将104种自然元素完美地排列起来，同族性质相似的元素在同一区域或以实线相连（例如左侧的稀有气体元素）。

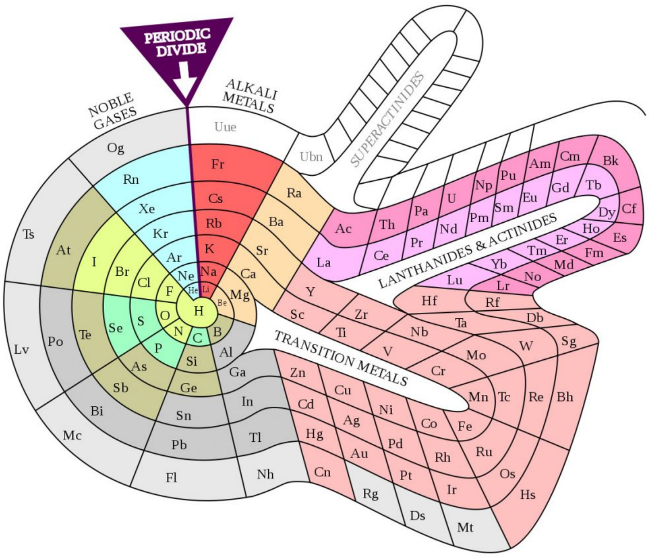




The Spiral Periodic Table (1960)

Similar to the previous one, but with more of a snail shape, Theodor Benfey proposed this periodic table in the early 1960s, which also emphasizes the continuity of the elements rather than imposing artificial breaks (shown as “Periodic divide” in the image). As such, it illustrates more dramatically the different periods of 8, 18, and 32, while also allowing for the introduction of new elements (superactinides).

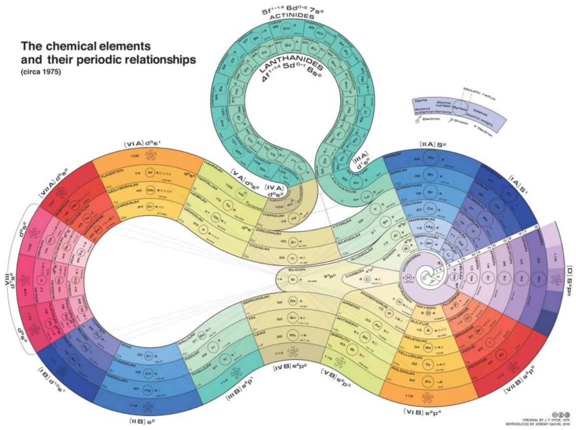
与前一张相似，但Theodor Benfey于上世纪60年代提出的这张元素周期表更像蜗牛。它也强调元素的连续性，而不是施加人为的断裂（如图中的“PERIODIC DIVIDE”）。因此，它更生动地展现了长度为8、18、32的不同周期，同时它也允许引入新元素。



The Curled-Ribbon Periodic Table (1975)

This one is particularly good-looking, although probably not that practical for everyday use. It was created in 1975 by organosilicon chemist James F. Hyde, although we are here showing the reproduction made by J. Sachs in 2016. Hyde’s point of view is obvious as silicon is featured right in the middle (between the two circles), showing also the connections of this element to many others in the graph (dashed lines). The list still begins with hydrogen (center of the main circle), before spiraling out into the different groups. The different colors also highlight the elements’ periodic relationships.

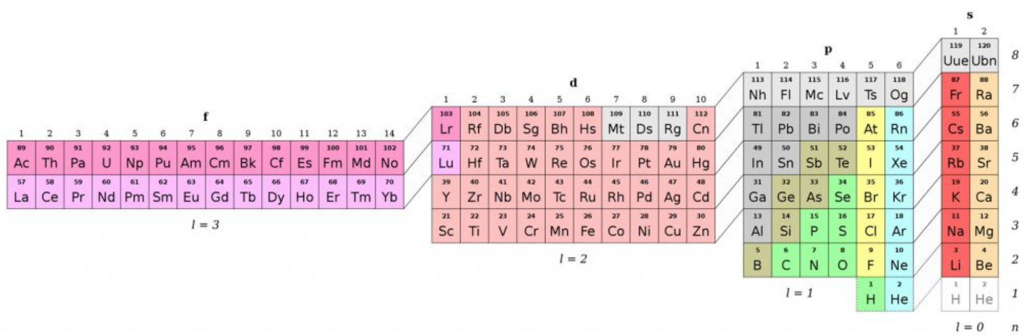
这张元素周期表很好看（尽管并不那么实用）。它是由有机硅化学家James F. Hyde于1975年设计的（图为J. Saches在2016年的复制版）。Hyde的观点是显然的，因为硅位于两个圆圈的正中间，并与图中的许多其他元素以虚线相连。这张周期表仍然是以氢（位于主圆中心）开始的，然后螺旋升至不同的周期。不同的颜色也突出了元素间的周期关系。



The Adomah Periodic Table (2006)

Also referred to as the "Perfect Periodic Table" by its designer, Valery Tsimmerman. The idea derives from a previous table by Charles Janet, who arranged the elements according to their electronic configuration in his Left-Step Periodic Table (1928). Instead, the Adomah system is set around the four quantum numbers of the electron configuration.
它的设计者Valery Tsimmerman将其称为"完美周期表"。这个想法源于Charles Janet于1928年设计的一张根据元素的电子结构排列元素的周期表，但Adomah系统是围绕电子结构的四个量子数设置的。

Two of the four quantum numbers (n and l) are reflected in the traditional periodic table. However, only the first three periods follow quantum number n. After that, the pattern breaks. The main blocks of the traditional periodic table (i.e., the s, f, d, and p blocks) are in fact presented in the order l = 0, 3, 2, 1, highlighting that this arrangement is indeed illogical. Of note, elements H and He are placed in two different positions to reflect their dual nature in terms of atomic structure and chemical properties.

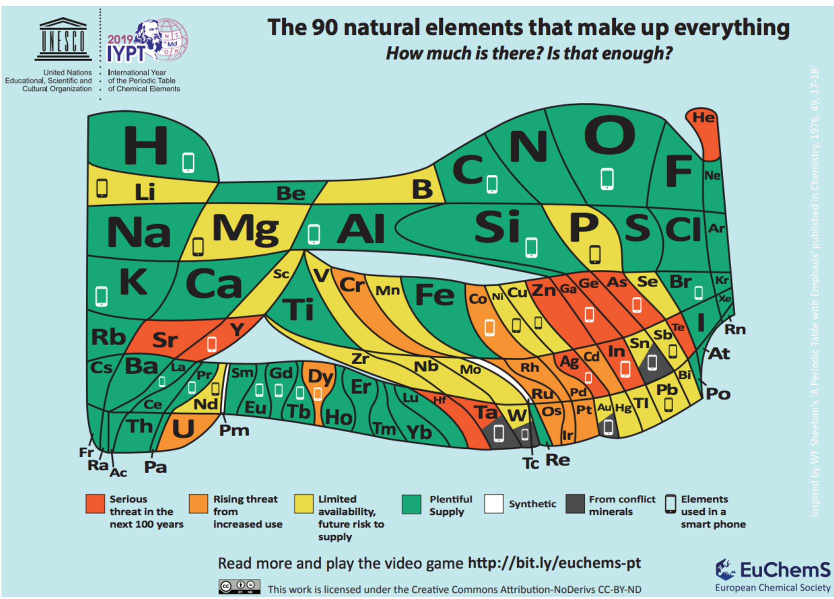


The Periodic Table of Element Scarcity (2018)

Well, this one is clearly based on the most traditional arrangement, but it is actually giving out completely different information. This is a periodic table with a purpose!
这张周期表显然是基于最传统的安排，但实际上它给出了完全不同的信息。

The European Chemical Society (EuChemS) has designed this table to make people reflect (and hopefully act) on the issue of element scarcity. The 90 natural elements that make up everything (literally!) have been drawn so that the area occupied by each element gives an indication of the amount of that element in the earth’s crust and atmosphere. In particular, it indicates the elements used in a smartphone (around 30!), over half of which may be in limited supply in the coming years. This is to show that we are consuming some elements very fast and their availability may become an issue unless we find ways to recycle them.
欧洲化学学会（European Chemical Society，EuChemS）设计了这个表格，引发人们思考（并采取行动解决）元素稀缺的问题。周期表上的每种元素（构成一切的90种自然元素）所占的面积表明了该元素在地壳和大气中的含量。特别的，它展示了智能手机中含有的元素（大约30种）。未来几年，其中一半以上可能供应有限，也就是说，我们正在快速消耗这些元素，除非我们找到回收它们的方法，否则将来它们的供应将成为一个严重问题。

Of note is helium, the only element that is truly “lost into space”, since it is so light that escapes the planet’s gravity.
值得注意的是氦，它是唯一一种消失在太空中的元素，因为它太轻了以至于逃脱了地球的引力。



The Periodic Table of Chemical Bonds (2019)

This one we owe to mathematicians at the Max Planck Institute, who investigated almost 5000 substances containing two elements in different proportions. Each circle in this hypergraph represents the bonding an element establishes with an organic residue. The bonds are then ordered by their polarizability (where more polarized bonds place the element higher in the graph). Here, two elements can be compared either through a direct arrow (e.g., the bonds of hydrogen, for example, are more polarized than those of boron) or by the chain of arrows between them (e.g., the oxygen bonds are more polarized than those of bromine). Finally, elements in circles with the same color present similar binding behavior.
Max Planck Institute（德国马克斯-普朗克研究所）的数学家们研究了近5000种含有两种不同比例元素的物质并绘制了这个超图（超图理论Hypergraph，图论的分支。超图是有限集合的子集系统，是最一般的离散结构，在信息科学、生命科学等领域有着广泛的应用）……