



# Elements 6

carbon

Oscar van Dillen

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# Elements 6: C

**Elements 6: Carbon** is the third album in a series of music on the Elements, a large work in progress consisting of electronically/digitally created architectural music compositions by Oscar van Dillen. The works on this album were composed November-December 2021.

All works, cover art and booklet of this album were created by Oscar van Dillen.

Total duration: 1:03:00 - tracks:

1. Carbon Dioxide	4:50
2. Buckminsterfullerene	11:07
3. Carbon Nanotubes	6:01
4. Biopolymers	20:37
5. Oil	8:37
6. Graphite	5:38
7. Diamond	6:13

## Ways of Listening to the Elements

The series *Elements* consist of digital compositions which have a more static, installation-like character, crossing the border between musical and spatial composition, linking up music and architecture, both arts concerning Space.

It is a remarkable feature of human anatomy that the inner ear is the organ that perceives sound as well as space. Inside in the *cochlea* resonating crystals distinguish the frequencies within sound. Outside on top of the same organ there are the three half-circles of the *Labyrinth*, perceiving spatial movement along an XYZ axis system.

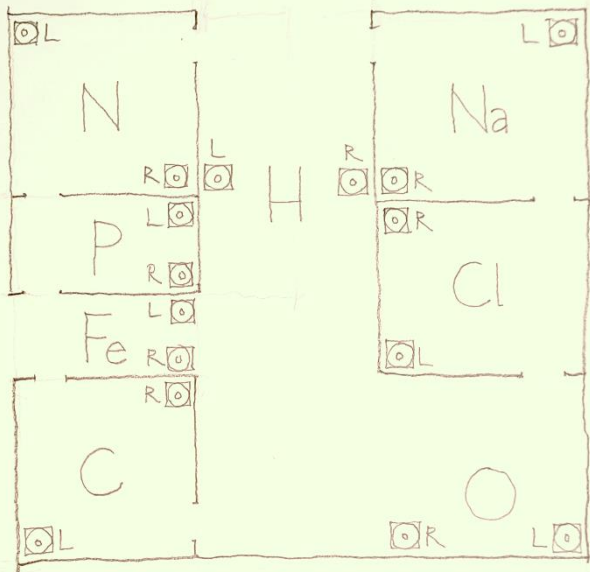
The direct perception of 4-dimensional space-time itself can be seen in this essential part of our anatomy: one organ handling perceptual elements of both space and time in unison.

Space, in the perception of XYZ orientation on the inside of the *Labyrinth*: spatial movement and balance. Time, or rather the inverse of time in Hz and frequency cycles/s in the perception of pitch on the inside the *Cochlea*.

Van Dillen's compositions in the series Elements can be listened to in several ways. Traditionally these are: privately over loudspeakers or headphones, or in a concert situation, that somewhat awkward setting where a group of interested people are sitting immobile and listening to what comes out precorded out of a professional loudspeaker system, with no apparent performers in sight.

Each of the Elements is created to be able to stand on its own, as a deeply composed and serious work of art, to be enjoyed on its own. Yet the Elements series as a whole has also been conceived to work and sound together as a larger ensemble: a potential meta-symphony of works, to be exhibited and enjoyed in an architectural sound installation of a variety of Elements set to play on repeat.

For installation playback of the series Elements, van Dillen proposes this option of creating simultaneously playing (looping) versions of various Elements widely spaced apart over a large space or several neighbouring spaces. Listeners could actively move around through the music or choose to linger or sit in certain spots for some time.



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Also at home, a smaller version of an installation can be realized by playing several (looping) compositions in adjacent rooms, so they somewhat overlap and audibly interact. The only thing needed is one playback device per home installation element.

It is the composer's wish that he himself as well as others will be able to create an ever-evolving range of different choreographies for various architectural installation performances of these works in the future, of diverse sizes and durations, ranging from the very intimate to the truly monumental and in everything between.

If such architectural installations would be placed in a museum, they would allow interaction with visual arts as well, but they could also be put in very dark settings.

Meanwhile at home, the listeners are challenged to DIY DJ and mix two or more of these compositions and turn one's home into a personal theatre or museum.

A degree of inclusion of the listener into the process of creation can thus be achieved.

## Elements of both Music and Chemistry

The Elements referred to in the title are obviously the chemical elements: the very first of the periodic table of which is Hydrogen with its remarkable isotopes Deuterium and Tritium, the only isotopes with their own chemical abbreviation. Less obvious from the titles is the use of Elements of Music, as described in his original approach to composing: his *method* (not a system) of *prepositional analysis*, developed from 1998-2011 by van Dillen.

Prepositional analysis is a new approach to the creation and analysis of music, not restricted to any style or vocabulary, but based on how humans hear music and perceive its elements Sound and Silence in interaction. Sound manifests itself in spectrum, time, and space, and from this observation 5 categories are derived, which sum up to 6 with silence included. These both include and transcend Stockhausen's 5 dimensions of sound (pitch, duration, volume, timbre, and place). Based on the interactions a set of 22 prepositional analytical concepts is postulated, for use in creative composition or analysis.

These elements of music have in fact been used for a longer time and some if not all of them can be found in music history. In the work on this album, they are used to create new music inspired by the chemical elements. The chemical elements being such basic building blocks of matter, represent the basis for every existence, and for life. By means of Mendeleev's system for natural matter, and thus for material nature, van Dillen ventured to compose his meta-symphony *Elements*.

	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18
1	1 H																	2 He
2	3 Li	4 Be											5 B	6 C	7 N	8 O	9 F	10 Ne
3	11 Na	12 Mg											13 Al	14 Si	15 P	16 S	17 Cl	18 Ar
4	19 K	20 Ca	21 Sc	22 Ti	23 V	24 Cr	25 Mn	26 Fe	27 Co	28 Ni	29 Cu	30 Zn	31 Ga	32 Ge	33 As	34 Se	35 Br	36 Kr
5	37 Rb	38 Sr	39 Y	40 Zr	41 Nb	42 Mo	43 Tc	44 Ru	45 Rh	46 Pd	47 Ag	48 Cd	49 In	50 Sn	51 Sb	52 Te	53 I	54 Xe
6	55 Cs	56 Ba		72 Hf	73 Ta	74 W	75 Re	76 Os	77 Ir	78 Pt	79 Au	80 Hg	81 Tl	82 Pb	83 Bi	84 Po	85 At	86 Rn
7	87 Fr	88 Ra		104 Rf	105 Db	106 Sg	107 Bh	108 Hs	109 Mt	110 Ds	111 Rg	112 Cn	113 Nh	114 Fl	115 Mc	116 Lv	117 Ts	118 Og
				57 La	58 Ce	59 Pr	60 Nd	61 Pm	62 Sm	63 Eu	64 Gd	65 Tb	66 Dy	67 Ho	68 Er	69 Tm	70 Yb	71 Lu
				89 Ac	90 Th	91 Pa	92 U	93 Np	94 Pu	95 Am	96 Cm	97 Bk	98 Cf	99 Es	100 Fm	101 Md	102 No	103 Lr

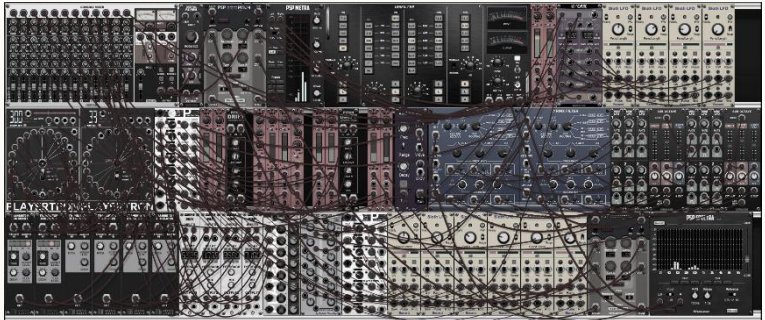


## Carbon

Carbon is above all the Element that makes life possible. As symbolized by the pencil drawing at this album's cover, it forms chains, and as basic carbon-based chains the amino acids are found in all life forms. As are the very long chains of amino acids, such as DNA, which is also based on carbon chains. Carbon chemistry has become such a special scientific field, it has its own name called organic or biochemistry, meaning chemistry involving carbon. We have hardly scratched the surface of this vast scientific field. In it is hidden still the secret to eternal life, if the key can be found to the (carbon based) chemistry that ages our bodies. Every 7 years or so, almost all of our bodies' cells die off and are replaced by new cells, but just these are made a little older than the ones they replace. The key to eternal life would be found if we can change the chemical components of the clock mechanism to force new cells to be made of a 30-year-old ideally aged body. Graphic novel authors Marvano and Haldeman speculate on this very real possibility in their series Dallas Barr.

Life on Earth is also made possible by the biogeochemical carbon cycle, gradually recycling the element step by step over the enormous timespan of 100-200 million years.

Two structural elements that make carbon bring life to our planet are therefore 1) the chains and 2) the cycle. These two structural elements form the base of the originally created modular instrument on which the music of this album was performed. The composition process for the music on this album therefore involved the design and creation of the instrument, of the 7-part music, and the recording of the performance of the music.



The essence of this modular setup is a generative instrument which does not need a keyboard player for every sound but can in fact be played by changing certain parameters, which in this case are tempo, filtering and pitch controls and modulations of all of these. The resulting music is self-generative to a degree but can be controlled and started or stopped at will. It is, as the image shows, a highly complex structure consisting of roughly 8-10 basic modules, each of these present in several versions with unique settings, all linked back to each other providing reflecting modulations sometimes leading to brief system oscillations, layers of which are modulated by glides, which also modulate other layers. The result is a music of many layers, distributed widely and changingly across the stereo field. Layers of tempo cycles lie at the very heart of the conception of the instrument and the music. The ranges of tempo used in the album go from 3 bpm all the way up to 450 bpm, always changing abruptly, using mostly prime number tempos, and mostly 5 layers of tempo at least, the maximum number of tempo layers audible is 26 if modulations are included, and in modulation/triggering, the lowest tempo is 0.03 bpm.

The modular instrument is in itself an intricate chain of modules, with many branching out and returning wires, creating more cycles: embedded cycles within cycles, at the heart of which are the circular modules on the left, generating base tempos for the most rhythmical layers.

In this way, chains and cycles have been made to be the very structural core of the composition.

Carbon unique in that it can be encountered in many forms or allotropes, ranging from atom-layered soft graphite to crystalline diamond, both pure carbon. The special atomic structures of carbon relatively recently discovered are C<sub>60</sub> (named after Buckminster Fuller) and the Nanotubes (CNTs), the latter used for its remarkable electrical conductivity, its exceptional tensile strength, and its thermal conductivity. Some carbon nanotubes are even metallic in character, demonstrating the huge versatility the single element carbon is capable of.

The 7 parts of the composition Carbon are inspired by essential aspects of this remarkable element.

## Carbon Dioxide

Today Carbon is especially known in its compound form Carbon Dioxide for its threat to our climate, because our economic system and its huge energy demands our present civilization runs on is almost entirely carbon-based, and we burn carbon stored in mineral and plant reserves at an irresponsible rate. Just short of suffocating humanity, the major powers of politics, economy and business are heating up the planet we call our home to average temperatures at which animal and plant life, also the kind we depend on for our food long-term, can no longer be sustained as before.

Carbon Dioxide however, also known by its chemical formula  $\text{CO}_2$ , is in itself vital for plant life: as animals (including us the human animals) breathe and need Oxygen, so all plants breathe and need  $\text{CO}_2$ . In this vital capacity, the opening music is titled accordingly.

The roughly pyramidally structured 3-part form music of Carbon Dioxide makes us enter into a world of fleeting

and floating sounds in a polyphony of many layers, each with its own register, but generally moving in a middle to low register. The music is partially rhythmical, but it has been created to contain forward motion rather than obvious repetitive patterns, to symbolize and represent the biogeochemical cycle. Therefore the tempo is not always quite clear, but the forward motion itself certainly is.

As with all the seven parts, when a part of the music of Carbon ends it almost never stops dead quickly but it has a bit of an “afterlife” before coming to the actual closing.

## **Buckminsterfullerene**

Buckminsterfullerene or C<sub>60</sub> is a special spherical structure of the element. Carbon is rather unique in that it can exist in several very different solid structures, called allotropes. In the C<sub>60</sub> allotrope a closed or semi-closed mesh of the atoms appear in a ball-like arrangement, closely related to the architect R. Buckminster Fuller's geodesic domes, after which it was named in honor.

The 1-part music of the second part Buckminsterfullerene is generally in a similar register as the first part, but its sounds are more rounded and disjointed, with less high noise particles accompaniment. There is an abundance of ricochets like bouncing balls, which as of this part become an integral part of the music as it continues in further parts.

## **Carbon Nanotubes**

The 4-part music of Carbon Nanotubes uses a middle-high to very high register throughout, starting contrastingly to the first two parts. Polyphonic and polyrhythmical layers interact, building up to higher density before receding and dissolving again.

Carbon Nanotubes are also called CNTs and are another Carbon allotrope. CNTs are single- or multi-walled tubes of a mesh of Carbon atoms, the width of which is measured in nanometers. A thousandth of a m (meter) is a mm (millimeter), a thousandth of which is a micron or  $\mu$ , a thousandth of a micron is a nanometer nm or  $\mu\mu$ . The materials based on these tiny tubes have remarkable

properties, some forms being exceptionally strong, and others creating even a metallic form of the non-metallic element Carbon.

## **Biopolymers**

The most famous Biopolymers are DNA and RNA, they consist of extremely long chains of amino acids, which structural element is Carbon. All life is Carbon-based.

The music of this, the fourth and longest part, revolves around the tone C#5, and is very rhythmical and fast, with tempos up to 200bpm, but tempos on this album are never metronomical throughout and move about their bpm numbers, generally in a middle to high register. The many cycles within cycles are also inspired by the hexagon structures, the planar Carbon-rings C<sub>6</sub>H<sub>6</sub> called Benzene, part of many larger biochemical compounds.

The music builds up gradually in density, complexity, and loudness, taking the listener along a journey with several stations on the way, and some stops or semi-stops



halfway. After a climax, a slow and very gradual “build-down” follows in this Pyramidal Form piece.

## **Oil**

The music of Oil contrasts the register with the previous part again in that it uses middle low to very low register. It is a 5-part form with sometimes almost a contemporary beat, though skirting the outside of this beat rather than indulging in a repetitive bass drum drone. Due to the cyclical nature of its rhythmical composition, there appear binary 2/4- and 4/4-time signatures in slow to medium tempo and also a slow ternary 3/4 before the end.

## **Graphite**

The pencil drawings on the album covers of the series *Elements* are all made with Graphite, a soft allotrope with layers of Carbon atoms, perfect for use in pencils.

The 3-part music of Graphite suggests a frantic drawing of lines, in many but mostly high, registers. The layers of sound correspond to the layers of atomic mesh in Graphite.

## **Diamond**

The 3-part deep and dark low register music of Diamond, gently rocking around but never at precisely 112bpm, suggests a world apart, like the very dense allotrope of Carbon that Diamond is.

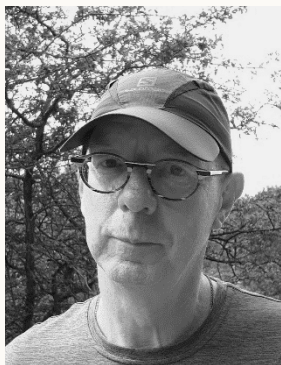
Diamond's 8 atoms so-called diamond-cubic crystal form (roughly two embedded cubes) is formed deep in the Earth at very high temperatures and pressures, and would convert back to graphite naturally, but not in a human lifetime: it does so very slowly over an extremely long timespan. Diamond holds 2 world records for being both the hardest material known and having the highest thermal conductivity known.

## Oscar van Dillen

Oscar Ignatius Joannes van Dillen

('s-Hertogenbosch 1958) is composer and performer of music, professor of music at Codarts University for the Arts in Rotterdam, as well as visual artist. A polyglot and an erudite world citizen, he is also one of the pioneers from the early years of Wikipedia, having been founding president of Wikimedia

Nederland and serving as a trustee of the Wikimedia Foundation. Van Dillen has studied a wide variety of musical traditions with many renowned teachers. His music education having started at the age of 7 and performing both classical and rock music in his youth, van Dillen first studied North-Indian classical music (sitar, tabla, vocal) with Jamaluddin Bhartiya at the Tritantri School in Amsterdam and bansuri with Gurbachan Singh Sachdev at the Bansuri School of Music in Berkeley, California. Next, he studied classical and jazz flute at the Sweelinck Conservatory in Amsterdam. He took composition lessons from Misha Mengelberg. As a flutist, he was taught by Lens Derogée and Dieks Visser, and followed masterclasses from Pierre-Yves Artaud, Geoffrey Gilbert and Barthold Kuijken.



After his following postgraduate studies of medieval and Renaissance music with Paul Van Nevel in Leuven (Belgium), he studied classical and contemporary composition with, among others, Dick Raaymakers, Diderik Wagenaar and Gilius van Bergeijk at the Koninklijk Conservatory in The Hague, with Klaas de Vries, Peter-Jan Wagemans and René Uijlenhoet at the Rotterdam Conservatory and with Manfred Trojahn at the Robert Schumann College in Düsseldorf, where he also received lessons in conducting from Lutz Herbig. As a composer he furthermore followed masterclasses from, among others, Isang Yun, George Crumb, Jan van Vlijmen, Marek Stachowski, Zbigniew Bojarski and Gerard Brophy.

A founding member of the Rotterdam School of composers and the author of its manifesto, he currently works as professor of music at the Codarts University of the Arts Rotterdam since 1997, teaching composing, arranging, world music composition, music history and music theory in the Jazz-, the Pop-, the World music, the Classical music and the Music Education Academies of Codarts.

Oscar van Dillen is the inventor of *original world music composition*, combining strictly composed with improvised classical and folk traditions, and their techniques and mentalities for creating music: a new and contemporary form of art music.

He is also founder, composer, and artistic director of the Olduvai Ensemble for which he created original world music compositions.

Van Dillen is a member of Nieuw Geneco and the Dutch-Flemish Society for Music Theory. As of 2020 his scores are published by Donemus. He collaborates with Donemus in publishing his recordings on OIJ Records.

Next to his fulltime work as composer, musician and pedagogue, van Dillen is also a visual artist. As composer, he has been a regular member of various juries, among which the yearly composition prize juries, in the Val Tidone Festival Competitions, since 2013.

Oscar van Dillen's personal website can be found at [www.oscarvandillen.com](http://www.oscarvandillen.com)

OIJRECORDS can be found at [www.oij-records.com](http://www.oij-records.com)

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# OIJ RECORDS

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