



## CTC List of Toxic Crystals including Crystals that are often mistakenly thought of as Toxic

There is a lot of information available on the internet about the topic of toxic crystals. Sadly, not all of that information is helpful as there are a lot of misunderstandings ‘out there’.

### The scientific stuff:

#### The Periodic Table of Elements

hydrogen 1 <b>H</b>																	helium 2 <b>He</b>																													
lithium 3 <b>Li</b>	beryllium 4 <b>Be</b>											boron 5 <b>B</b>	carbon 6 <b>C</b>	nitrogen 7 <b>N</b>	oxygen 8 <b>O</b>	fluorine 9 <b>F</b>	neon 10 <b>Ne</b>																													
sodium 11 <b>Na</b>	magnesium 12 <b>Mg</b>											aluminum 13 <b>Al</b>	silicon 14 <b>Si</b>	phosphorus 15 <b>P</b>	sulfur 16 <b>S</b>	chlorine 17 <b>Cl</b>	argon 18 <b>Ar</b>																													
potassium 19 <b>K</b>	calcium 20 <b>Ca</b>	scandium 21 <b>Sc</b>	titanium 22 <b>Ti</b>	vanadium 23 <b>V</b>	chromium 24 <b>Cr</b>	manganese 25 <b>Mn</b>	iron 26 <b>Fe</b>	cobalt 27 <b>Co</b>	nickel 28 <b>Ni</b>	copper 29 <b>Cu</b>	zinc 30 <b>Zn</b>	gallium 31 <b>Ga</b>	germanium 32 <b>Ge</b>	arsenic 33 <b>As</b>	selenium 34 <b>Se</b>	bromine 35 <b>Br</b>	krypton 36 <b>Kr</b>																													
rubidium 37 <b>Rb</b>	strontium 38 <b>Sr</b>	yttrium 39 <b>Y</b>	zirconium 40 <b>Zr</b>	niobium 41 <b>Nb</b>	molybdenum 42 <b>Mo</b>	technetium 43 <b>Tc</b>	ruthenium 44 <b>Ru</b>	rhodium 45 <b>Rh</b>	palladium 46 <b>Pd</b>	silver 47 <b>Ag</b>	cadmium 48 <b>Cd</b>	indium 49 <b>In</b>	tin 50 <b>Sn</b>	antimony 51 <b>Sb</b>	tellurium 52 <b>Te</b>	iodine 53 <b>I</b>	xenon 54 <b>Xe</b>																													
caesium 55 <b>Cs</b>	barium 56 <b>Ba</b>	57-70 * <b>Lu</b>	hafnium 71 <b>Hf</b>	tantalum 72 <b>Ta</b>	tungsten 73 <b>W</b>	rhenium 74 <b>Re</b>	osmium 75 <b>Os</b>	iridium 76 <b>Ir</b>	platinum 77 <b>Pt</b>	gold 78 <b>Au</b>	mercury 79 <b>Hg</b>	thallium 80 <b>Tl</b>	lead 81 <b>Pb</b>	bismuth 82 <b>Bi</b>	polonium 83 <b>Po</b>	astatine 84 <b>At</b>	radon 85 <b>Rn</b>																													
francium 87 <b>Fr</b>	radium 88 <b>Ra</b>	89-102 ** <b>Lr</b>	lawrencium 103 <b>Lr</b>	rutherfordium 104 <b>Rf</b>	dubnium 105 <b>Db</b>	seaborgium 106 <b>Sg</b>	bohrium 107 <b>Bh</b>	hassium 108 <b>Hs</b>	meitnerium 109 <b>Mt</b>	darmstadtium 110 <b>Ds</b>	roentgenium 111 <b>Rg</b>	ununbium 112 <b>Uub</b>	ununtrium 113 <b>Uut</b>	ununquadium 114 <b>Uuq</b>	ununpentium 115 <b>Uup</b>	ununhexium 116 <b>Uuh</b>	ununseptium 117 <b>Uus</b>	ununoctium 118 <b>Uuo</b>																												
<table border="1" style="width: 100%; border-collapse: collapse; text-align: center;"> <tbody> <tr> <td>lanthanum 57 <b>La</b></td> <td>cerium 58 <b>Ce</b></td> <td>praseodymium 59 <b>Pr</b></td> <td>neodymium 60 <b>Nd</b></td> <td>promethium 61 <b>Pm</b></td> <td>samarium 62 <b>Sm</b></td> <td>europium 63 <b>Eu</b></td> <td>gadolinium 64 <b>Gd</b></td> <td>terbium 65 <b>Tb</b></td> <td>dysprosium 66 <b>Dy</b></td> <td>holmium 67 <b>Hf</b></td> <td>erbium 68 <b>Er</b></td> <td>thulium 69 <b>Tm</b></td> <td>ytterbium 70 <b>Yb</b></td> </tr> <tr> <td>actinium 89 <b>Ac</b></td> <td>thorium 90 <b>Th</b></td> <td>protactinium 91 <b>Pa</b></td> <td>uranium 92 <b>U</b></td> <td>neptunium 93 <b>Np</b></td> <td>plutonium 94 <b>Pu</b></td> <td>americium 95 <b>Am</b></td> <td>curium 96 <b>Cm</b></td> <td>berkelium 97 <b>Bk</b></td> <td>californium 98 <b>Cf</b></td> <td>einsteinium 99 <b>Es</b></td> <td>fermium 100 <b>Fm</b></td> <td>mendelevium 101 <b>Md</b></td> <td>nobelium 102 <b>No</b></td> </tr> </tbody> </table>																			lanthanum 57 <b>La</b>	cerium 58 <b>Ce</b>	praseodymium 59 <b>Pr</b>	neodymium 60 <b>Nd</b>	promethium 61 <b>Pm</b>	samarium 62 <b>Sm</b>	europium 63 <b>Eu</b>	gadolinium 64 <b>Gd</b>	terbium 65 <b>Tb</b>	dysprosium 66 <b>Dy</b>	holmium 67 <b>Hf</b>	erbium 68 <b>Er</b>	thulium 69 <b>Tm</b>	ytterbium 70 <b>Yb</b>	actinium 89 <b>Ac</b>	thorium 90 <b>Th</b>	protactinium 91 <b>Pa</b>	uranium 92 <b>U</b>	neptunium 93 <b>Np</b>	plutonium 94 <b>Pu</b>	americium 95 <b>Am</b>	curium 96 <b>Cm</b>	berkelium 97 <b>Bk</b>	californium 98 <b>Cf</b>	einsteinium 99 <b>Es</b>	fermium 100 <b>Fm</b>	mendelevium 101 <b>Md</b>	nobelium 102 <b>No</b>
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Please don't panic.

Crystal therapists are used to seeing this information when looking at the chemical formulae of crystals. Reputable listings of crystals should have chemical formulae present. This table can be quite useful.

#### Points:

1. The elements near the top of the table have smaller atoms and when it comes to stability of molecules.
2. Elements on the left are the metals, elements on the right are non-metals
3. Metals on the border-line – like aluminium – can behave like both metal and non-metal
4. The elements near the bottom of the table have quite big atoms and become increasingly unstable. That is why some of those, number 43, Tc (Technetium), 61 Promethium, and then all elements from 84 Polonium onwards, are naturally radioactive and have no form (isotope) that is stable.

A group of atoms bonded together, representing the smallest fundamental unit of a chemical compound that can take part in a chemical reaction, is called a molecule.

In crystal terms the size of the atoms that combine to form a molecule, determine the shape of the crystal system.

The simplest shape occurs when two atoms of approximately the same size bond together – this creates the cubic system. Therefore, the atoms of metals, like gold that bond together create the basic cubic shape.

Any molecule that creates a shape that fits into the crystal systems have an inherent stability. However, when large atoms are involved some atoms or molecules do ‘escape’ when subject to external forces. This is because the bonding holding the molecules together is not as strong as with smaller atoms.

**For example: Pb – Lead, number 82**

Lead as a metal is poisonous, as people found out to their costs when lead piping and soldering was used for domestic water. Some of the Lead atoms leached into the water, especially when used for hot water.

Galena – Lead Sulfide (PbS) is poisonous. It is soft (Mohs’s Scale 2.5) and the huge difference in size between the Sulfur (number 16) atom and the Lead atom, creates a potential for leeching.

**Chemical Symbols used in for most crystal healing/therapy stones:**

Ag	Silver
Al	Aluminium
Au	Gold
B	Boron
Be	Beryllium
C	Carbon
Ca	Calcium
Cl	Chlorine
Cr	Chromium
Cu	Copper
F	Fluorine
Fe	Iron
H	Hydrogen
K	Potassium
Li	Lithium
Mg	Magnesium
Mn	Manganese
Na	Sodium
O	Oxygen
P	Phosphorus
S	Sulphur
Si	Silicon
Sr	Strontium
Ti	Titanium
Zn	Zinc
Zr	Zirconium

## Stability and Unreactive

In everyday language, a compound is said to be "stable" if it is not particularly reactive in the environment or during normal use, and keeps its properties over a reasonable timescale. This means that in the presence of air, moisture or heat the compound remains the same.

## Mohs' Scale

'The Mohs' scale of mineral hardness is a qualitative ordinal scale characterizing scratch resistance of various minerals through the ability of harder material to scratch softer material.'

As crystal therapists we need to know our Mohs' Scale. It tells us how soft or hard a crystal is, thereby giving us information on storage, solubility in water, ability to absorb energy, safety in use.

Softer stones tend to be soluble in water and often created from differing sizes of atoms, leading to potential leeching into the environment – therefore potentially unstable and reactive.

Harder crystals, are not soluble in water, safe to handle – therefore stable and unreactive, in scientific terms.

Mohs' Scale	Crystals
1	Talc, Sulphur, Graphite, *Orpiment, *Realgar, Covellite, Ulexite
2	Gypsum, Halite, (man-made Nickel crystals), Fuchsite, Lepidolite, Amber
3	Copper, Silver, Bismuth, Gold, *Stibnite, *Cinnabar, *Galena, Chalcopyrite, Calcite, Aragonite, Anhydrite/Angelite, Celestite, Chrysocolla, Stilbite, Astrophyllite
4	Serpentine, Iron, Fluorite, Rhodocrosite, Malachite, Apophyllite, Kyanite,
5	Limonite (Boji stones and Moqui marbles), Turquoise, Apatite, Lapis Lazuli, Sodalite, Larimar, Dioptase,
6	Jade/Nephrite, Iron Pyrites, Opal, Rutile, Haematite, Petalite, Moonstone, Amazonite, Labradorite, Kunzite etc, Prehnite, Olivine/Peridot, Rhodonite,
7	All Quartz varieties, Chalcedony/Agate, Aventurine, Tiger's Eye, Staurolite, Zircon,
8	Beryl family (Emerald, Aquamarine, Morganite etc), Chiastolite, Tourmalines, Danburite, Dumortierite, Garnet family, Topaz, Phenakite,
9	Corundum family – sapphire, ruby

\*These are poisonous

## The practical stuff:

### With all the above in mind:

#### Toxic for sure:

Adamite ( $\text{Zn,Cu,Co})_2(\text{AsO}_4)(\text{OH})$  – contains arsenic (Mohs 3.5)

Arsenopyrite –  $\text{FeAsS}$  – Iron arsenic sulfide

Cinnabar –  $\text{HgS}$ , Mercury sulfide

Conichacite  $\text{CaCu}(\text{AsO}_4)(\text{OH})$  – contains arsenic (Mohs 4.5)

Crystotile/ Reibeckite (asbestos) a fibrous form of serpentine.

However, when held in quartz as in Tiger's Eye as crocidolite and actinolite quartz. It is safe. (Mohs 6)

Galena –  $\text{PbS}$ , Lead Sulfide

Lead -  $\text{Pb}$

Mohawkite –  $\text{Cu}_3\text{As}$  up to  $\text{Cu}_6\text{As}$  - Copper arsenide

Orpiment –  $\text{As}_2\text{S}_3$  - Arsenic sulfide

Realgar -  $\text{As}_2\text{S}_3$ , Arsenic sulfide (decays into orpiment)

Stibnite - also known as Antimony -  $\text{Sb}_2\text{S}_3$

Wulfenite -  $\text{PbMoO}_4$ , Lead Molybdenate

Some of these can be bought. In a public place, they should be kept in sealed plastic containers.

#### Not stable or too soft for gem essences made by the direct method

Azurite - Copper carbonate  $\text{Cu}_3(\text{CO}_3)_2(\text{OH})_2$ , (Mohs 3.5-4) oxidises to malachite when open to air

Atacamite – copper chloride hydroxide  $\text{Cu}_2\text{Cl}(\text{OH})_3$ .

Celestite – strontium sulphate – strontium held in a stable form. (Mohs 3-3.5), not radioactive

Covellite –  $\text{CuS}$  copper is safely locked into the crystal molecule but very soft (Mohs 1.5-2)

Cuprite - $\text{Cu}_2\text{O}$  (Mohs 3.5-4)

Halite –  $\text{NaCl}$  – salt, will dissolve if placed in water

Malachite – the surface will dull if placed in water

Selenite – will dissolve if placed in water

Sulfur – will gradually dissolve if placed in water

Vanadinite –  $\text{Pb}_5(\text{VO}_4)_3\text{Cl}$

## Not Toxic but often thought of as such:

Amazonite – copper is safely locked into the crystal molecule  
Black Tourmaline - aluminium is safely locked into the crystal molecule (Mohs 7-7.5)  
Boji-stones (aka Moqui Balls, Shaman Stone, Shamanic Star Stone) – iron  
Celestite – strontium sulphate – strontium held in a stable form. (Mohs 3-3.5), not radioactive  
Chalcopyrite - copper is safely locked into the crystal molecule  
Chrysocolla – copper silicate copper is safely locked into the crystal molecule (Mohs 2.5-3.5)  
Copper – Cu<sub>2</sub> (Mohs 3)  
Covellite – CuS copper is safely locked into the crystal molecule but very soft (Mohs 1.5-2)  
Beryl family – aluminium is safely locked into the crystal molecule (Mohs 7.5-8)  
(Bixbite, Emerald, Aquamarine, Goshenite, Heliodor, Morganite)  
Diopside – copper is safely locked into the crystal molecule  
Dumortierite - aluminium is safely locked into the crystal molecule  
Fluorite – Fluorine is safely locked into the crystal molecule  
Garnets - aluminium is safely locked into the crystal molecule  
Gem silica - copper is safely locked into the crystal molecule  
Sapphire, ruby - aluminium is safely locked into the crystal molecule (Mohs 9)  
Hematite - iron, will rust open to the air or water  
Iolite - aluminium is safely locked into the crystal molecule  
Kunzite - aluminium is safely locked into the crystal molecule  
Labradorite - aluminium is safely locked into the crystal molecule  
Lapis Lazuli - aluminium is safely locked into the crystal molecule  
Lepidolite - aluminium is safely locked into the crystal molecule  
Magnetite – may rust in contact with air and water  
Malachite – only the dust is toxic  
Marcasite - sulfur is safely locked into the crystal molecule  
Moldavite - aluminium is safely locked into the crystal molecule  
Moonstone - aluminium is safely locked into the crystal molecule  
Morganite - aluminium is safely locked into the crystal molecule  
Pietersite - asbestos is safely locked into the crystal molecule  
Prehnite - aluminium is safely locked into the crystal molecule  
Psilomelane - barium is safely locked into the crystal molecule  
Pyrite – both iron and sulfur are safely locked into the crystal molecule  
Ruby - aluminium is safely locked into the crystal molecule  
Sapphire - aluminium is safely locked into the crystal molecule  
Selenite - water soluble (Mohs 2)  
Serpentine - asbestos is safely locked into the crystal molecule  
Sodalite - aluminium is safely locked into the crystal molecule  
Spinel - aluminium is safely locked into the crystal molecule  
Spodumene (aka Kunzite) - aluminium is safely locked into the crystal molecule  
Staurolite - aluminium is safely locked into the crystal molecule  
Stilbite - aluminium is safely locked into the crystal molecule  
Sugilite - aluminium is safely locked into the crystal molecule  
Sunstone - aluminium is safely locked into the crystal molecule  
Tanzanite – aluminium is safely locked into the crystal molecule  
Tiger Eye - asbestos is safely locked into the crystal molecule  
Tourmaline - aluminium is safely locked into the crystal molecule  
Turquoise – copper and aluminium is safely locked into the crystal molecule (Mohs 5-6)  
Variscite - aluminium is safely locked into the crystal molecule

Vesuvianite - aluminium is safely locked into the crystal molecule

Wavellite - aluminium is safely locked into the crystal molecule

Zircon - aluminium is safely locked into the crystal molecule, not radioactive

Zoisite - aluminium is safely locked into the crystal molecule

### **Treated/enhanced stones:**

#### **Glass/lead filling, especially in corundum.**

Filling is often used on gemstones with surface fractures or cavities. Glass, lead or other materials are used to fill these cracks and holes.

Rubies and sapphires are commonly treated in this way. This hides the cavities and also improves the colour of the stone. If you have stones treated in this way, remember, Lead is toxic so precautions need to be taken if placing directly on the skin.

**Use your head, use the Mohs' Scale, know your crystal systems**