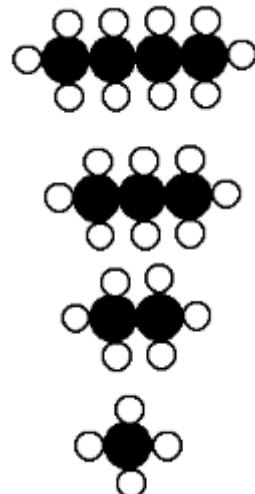


Covalent molecular compounds



Simple molecular substances have low melting and boiling points (typically $< 150^{\circ}\text{C}$) but atoms inside are held together by strong covalent bonds

The greater the molecular mass (mass of all atoms added together) the higher the melting and boiling points are:



Boiling point $^{\circ}\text{C}$	Name
-0.5	butane
-42	propane
-89	ethane
-164	methane

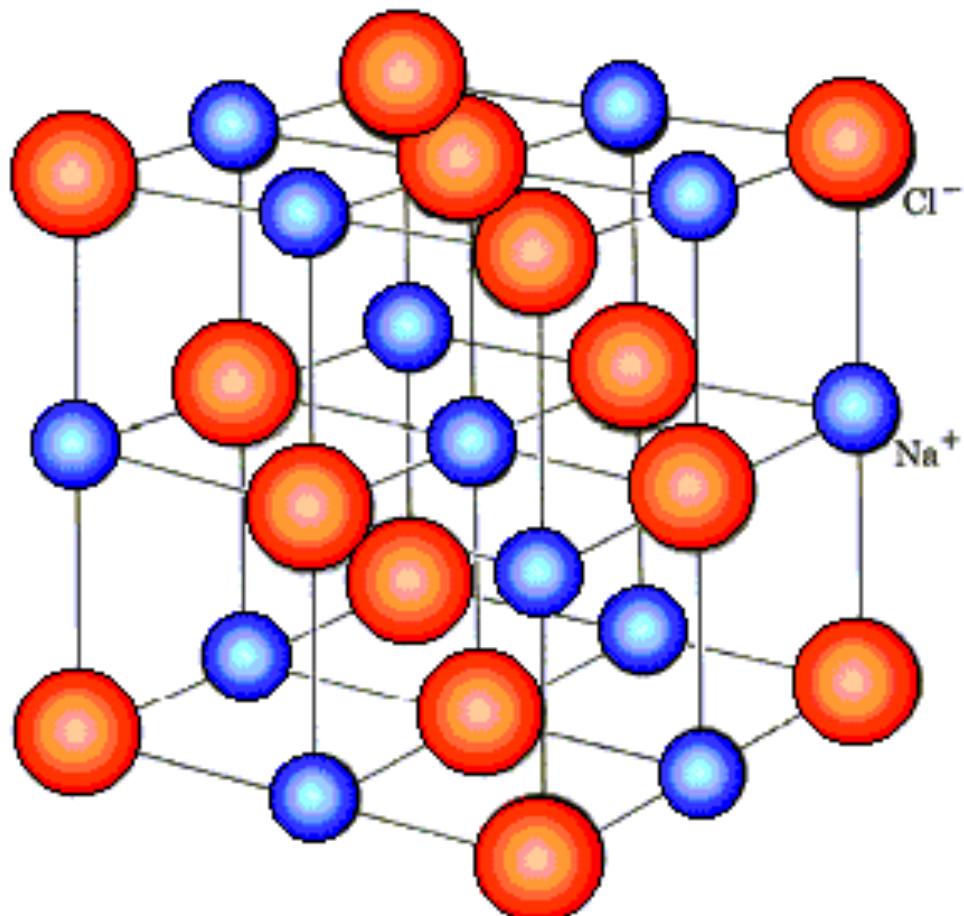
Halogens

Melting point °C	Boiling point °C	Name
-220	-188	Fluorine
-101	-35	Chlorine
-7	59	Bromine
114	184	Iodine
302	337	Astatine

Ionic compounds

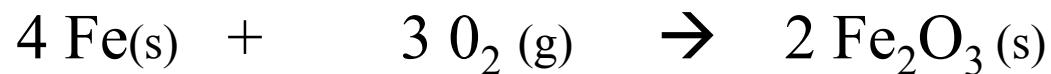


Ionic compounds have high melting points and contain no molecules. They are made of ions held together in a ‘giant lattice’ by strong electrostatic forces.

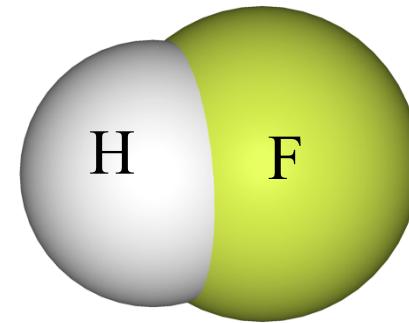


Formula	Mpt.(°C)
Al_2O_3	2072
NaCl	801
BN	2973

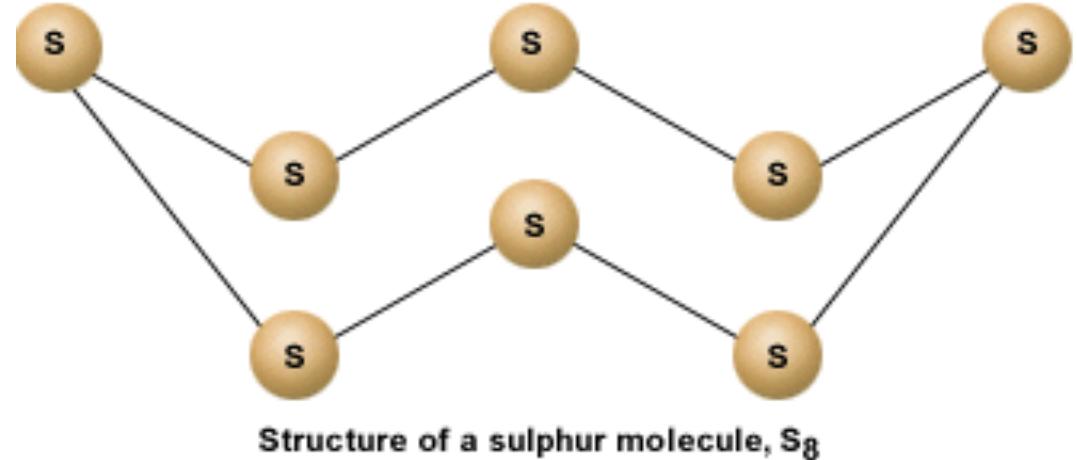
To prepare an ionic compound react a metal with a non-metal



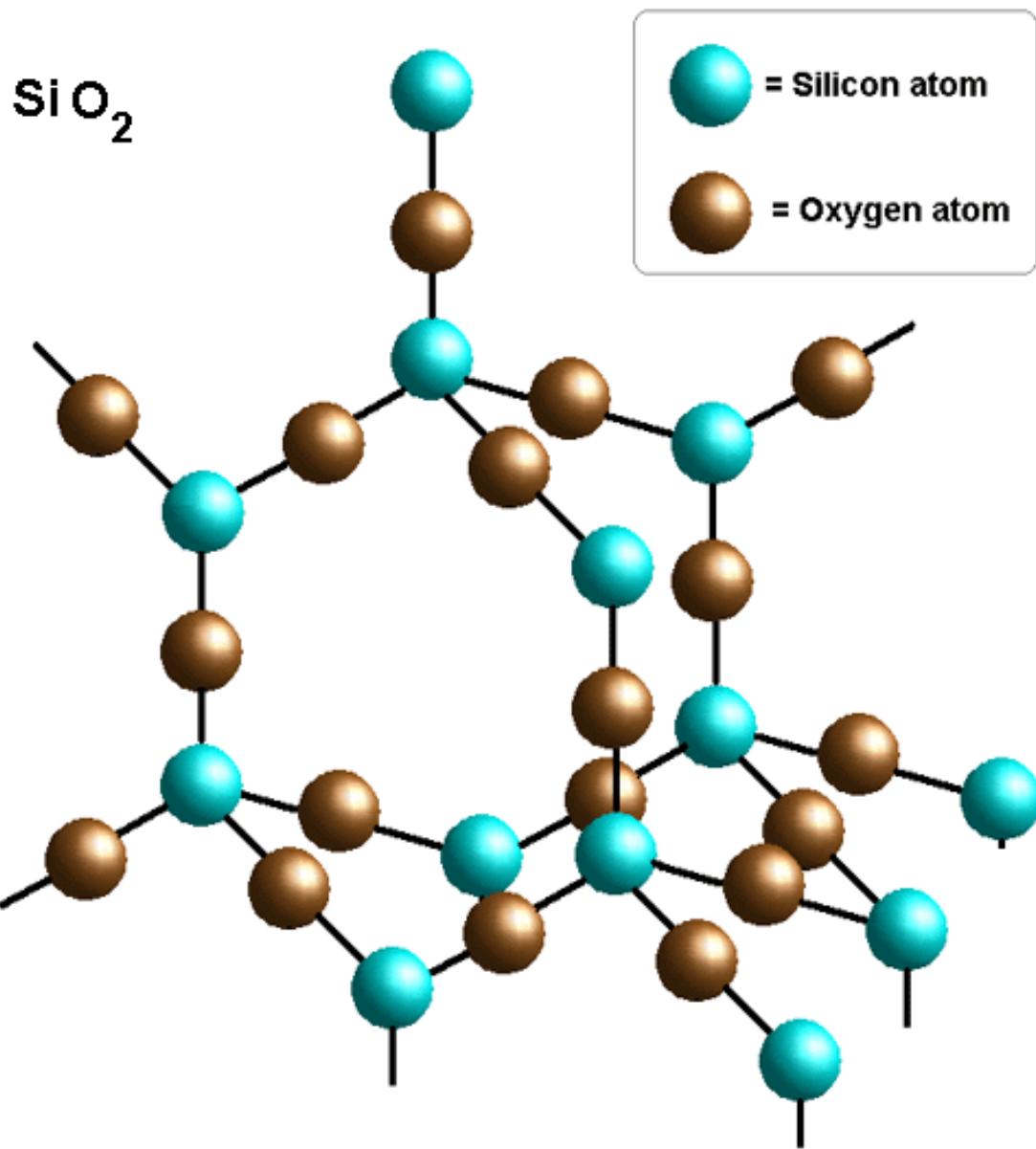
To prepare a simple covalent compound react a non-metal with another non-metal



Many elements exist as covalently bonded molecular substances (but they are not compounds!)



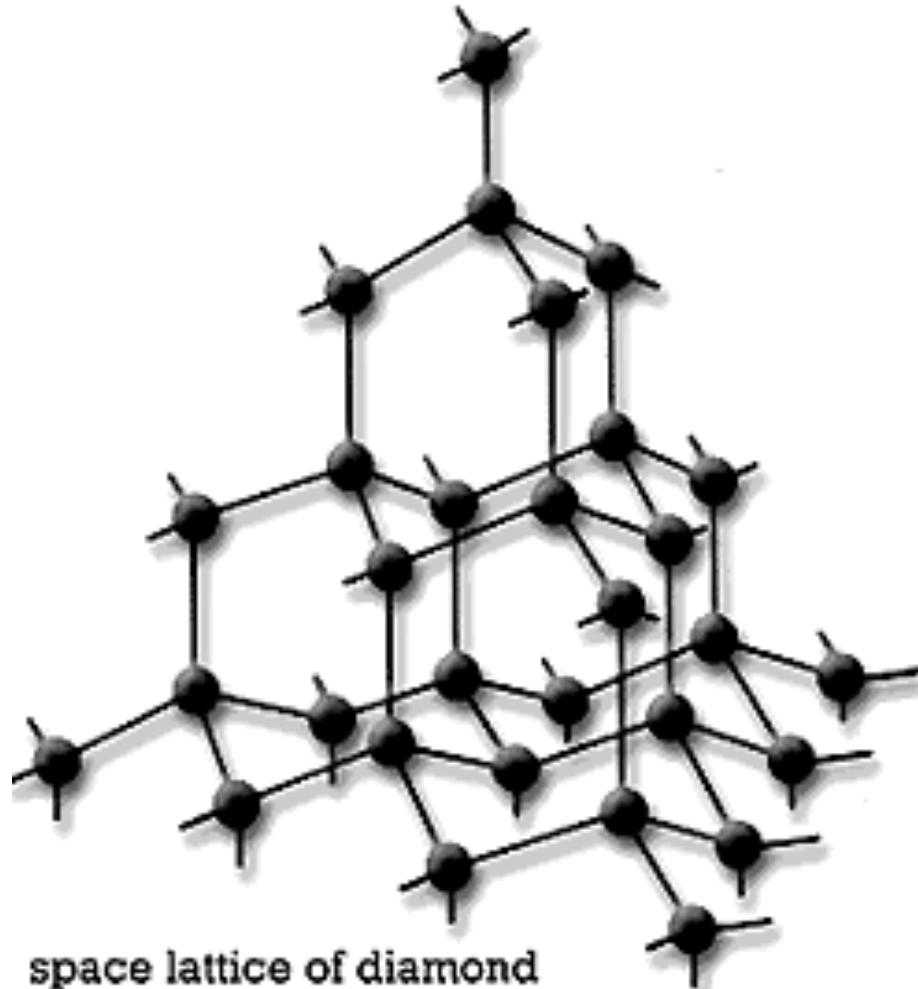
Giant molecular compounds also exist. These are special cases, the lattice is one giant covalently bonded molecule!



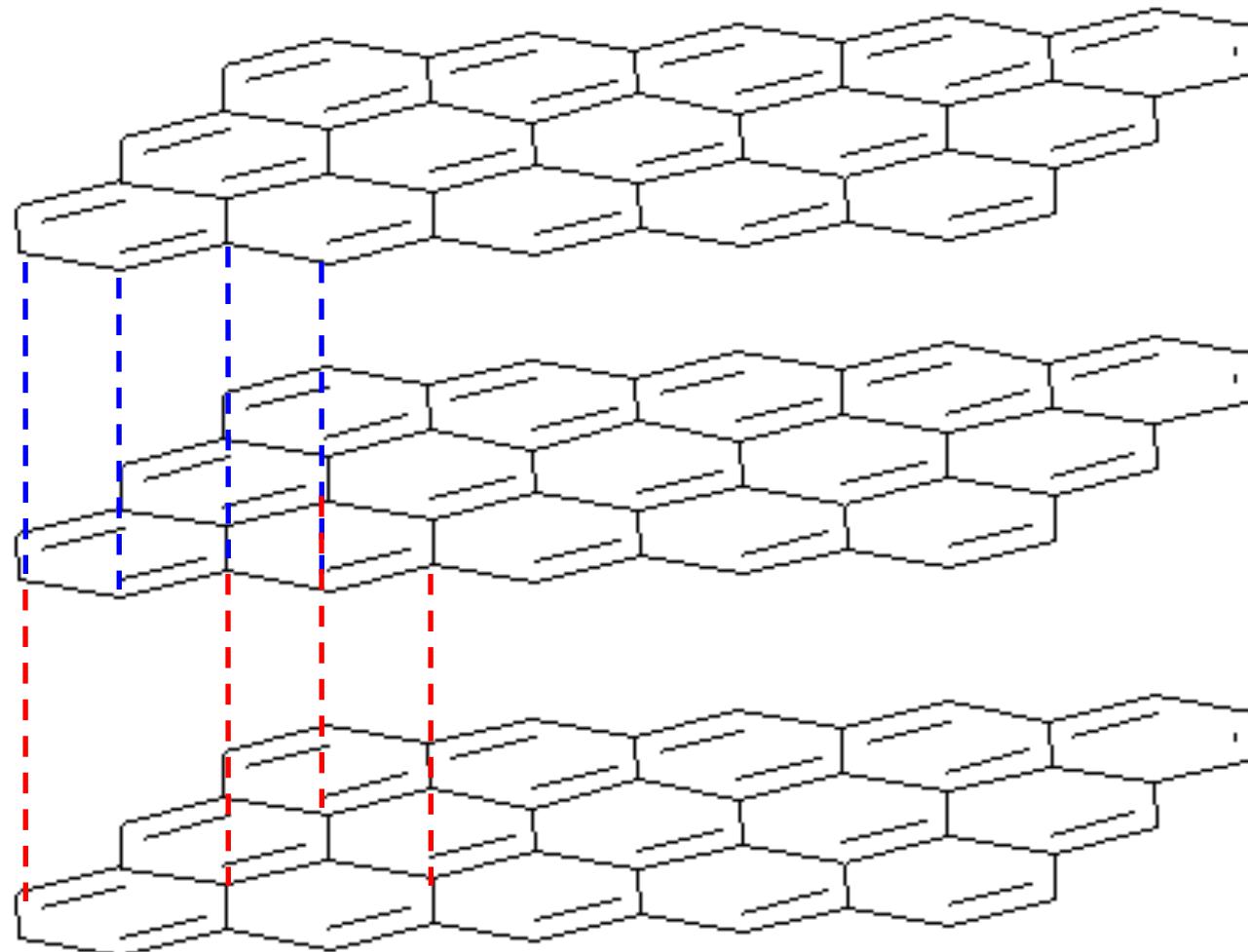
Diamond, graphite have a giant molecular structure too:



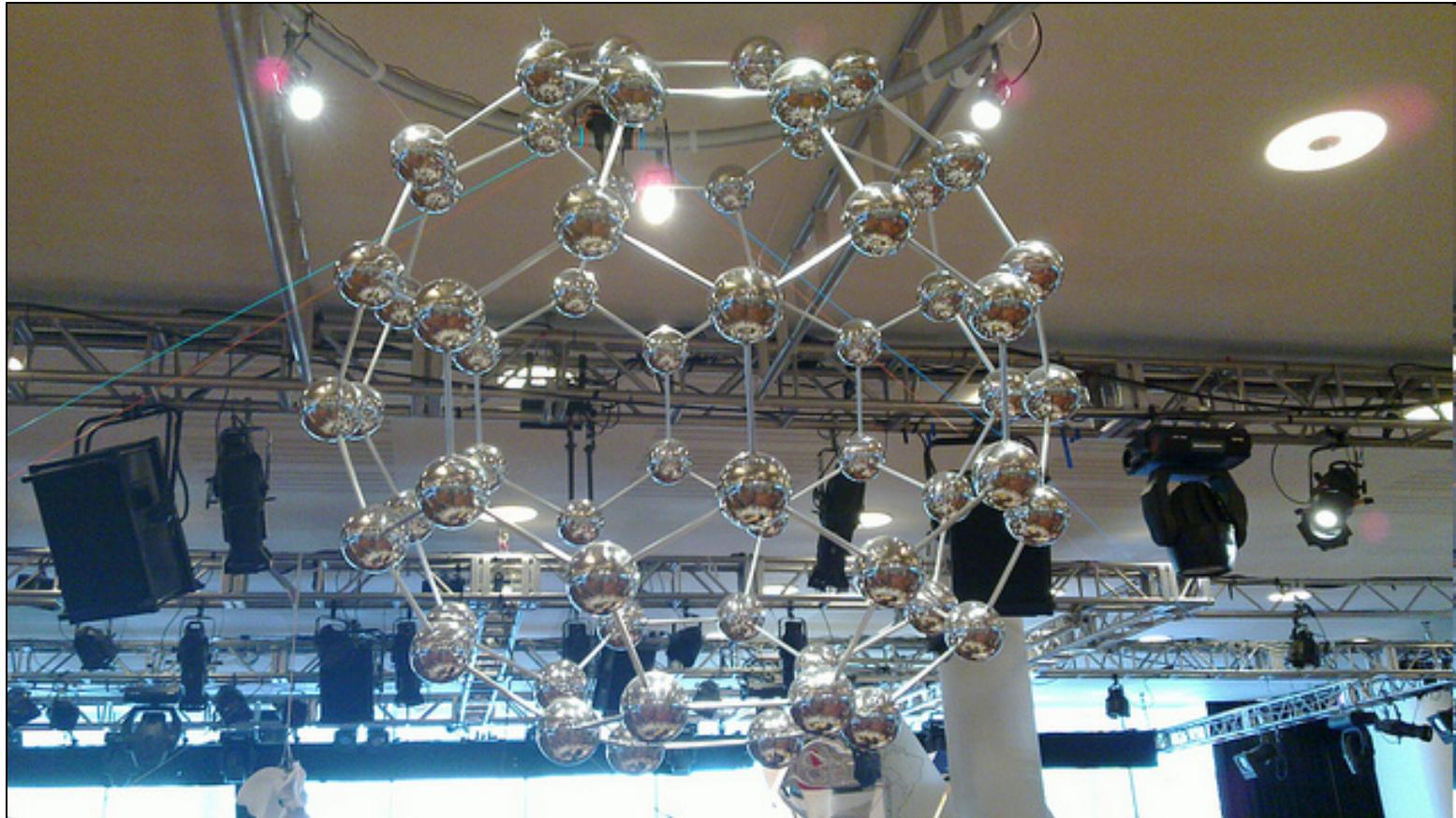
*It could be said that
The Culinan diamond
was the largest organic
molecule known before
it was cut*



Graphite has strong covalent bonds within planes only
Weaker attractions hold the planes loosely together



Diamond & graphite have a giant molecular structure
but what about this form of carbon?



This is a model of C₆₀ a large but covalent molecular substance
DNA, sugars and water are also covalent molecular substances