

# Printout

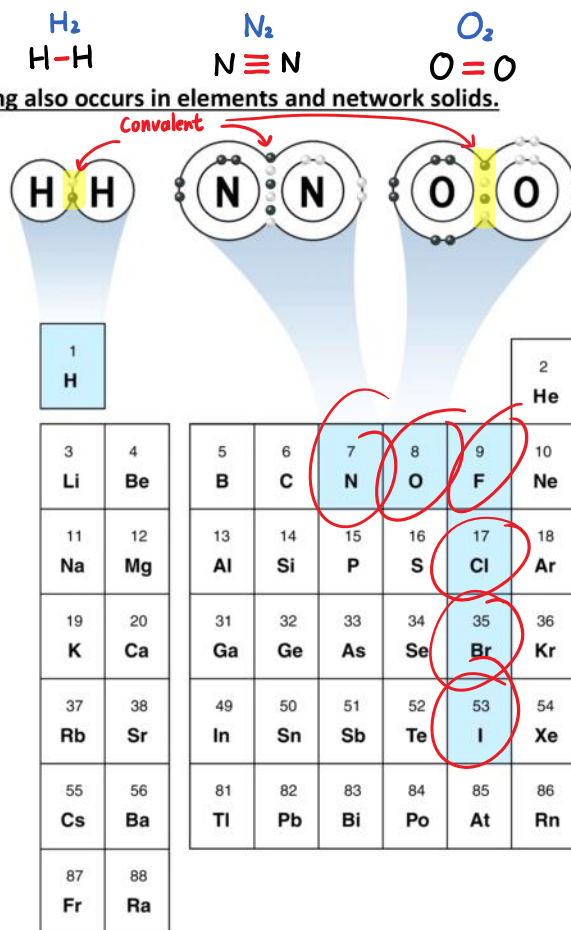
November 30, 2022 9:42 AM

Science 9 – Chemistry Topic 2.4 – Concept 4: Covalent bonding also occurs in elements and network solids.

## Diatomic Molecules (7 in total)

Seven elements are made up of molecules held together with covalent bonds under normal conditions:

- $H_2, F_2, Cl_2, Br_2, I_2$ : Two atoms share one electron in a covalent bond
- $O_2$ : Two atoms share two pairs of electrons to form two covalent bonds (double bond)
- $N_2$ : Two nitrogen atoms share three pairs of electrons to form three covalent bonds (triple bond)



**Network solid:** Non-metal elements containing convalent bonds that connect their atoms in one large network; essentially forming one giant molecule.

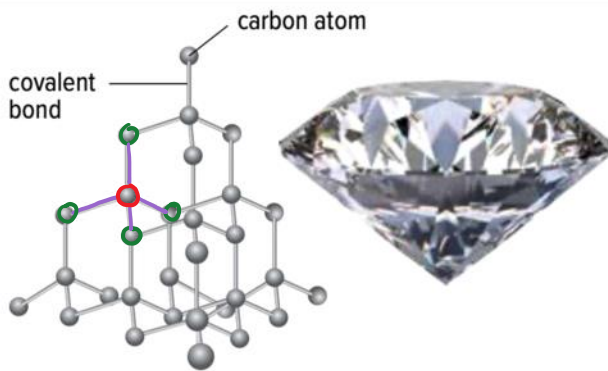
### Example: Silicon dioxide (SiO<sub>2</sub>) – Quartz

<p><u>Sillicon</u> and <u>Oxygen</u> atoms are bonded in a regular, <u>repeating</u> structure by covalent bonds</p>	<p>In real <u>Quartz</u> crystals, billions of SiO<sub>2</sub> molecules are bonded together in the same repeating structure, forming one giant molecule.</p>
	<p style="text-align: center;">2D CRYSTAL STRUCTURE</p> <div style="text-align: right; padding-right: 20px;"> <p style="font-size: small; text-align: right;">© Johnbetts-fineminerals.com</p> </div>

Example: Carbon

Carbon (Diamond form – network solid):

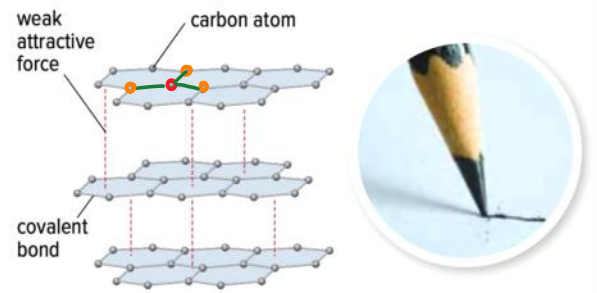
- Each carbon atom is bonded to four other carbon atoms by covalent bonds
- Forms strong 3-D structure



ex, pencil tip

Carbon (Graphite form – not a network solid):

- Each carbon atom forms covalent bonds with three other carbon atoms, forming sheets
- Sheets are weakly attracted to each other and can slide around
- As you write on paper, layers of graphite slide off the pencil tip and onto the page



**Graphite**

Graphite is made up of carbon atoms that are each bonded to three other carbon atoms, forming flat sheets. The sheets can slide past one another relatively easily.

HW

WB: P. 90-92