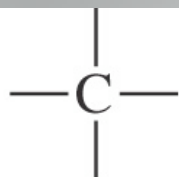
A ball-and-stick molecular model of a crystal lattice, likely diamond or silicon, with dark grey spheres representing carbon atoms and light grey spheres representing hydrogen atoms. The structure is shown in a perspective view, with some atoms in the foreground and others receding into the background.

Introduction to Organic Chemistry

Carbon Compounds
&
Molecular Structure

Introduction to Organic Chemistry: Carbon Compounds

- Because carbon generally makes four bonds to achieve its octet, it is described as tetravalent.
- Other atoms, based on the number of bonds that they make, have different valences.



**Carbon atoms
are tetravalent**



**Oxygen atoms
are divalent**



**Hydrogen and halogen
atoms are monovalent**

- What would the valence of nitrogen (N) be described as?

Isomerism

- **Isomers** are molecules with the same formula but differing arrangements of atoms.

We will consider two common types of isomerism in organic (carbon-containing) compounds:

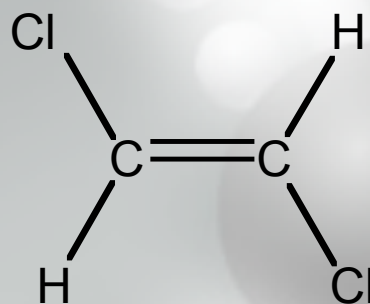
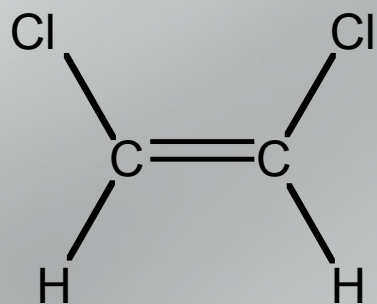
- **Cis / Trans Isomerism** refers to the different orientations of groups attached to the carbons of a double bond.
- **Structural Isomerism** occurs when the connectivity of the atoms differ.

Cis-trans isomers

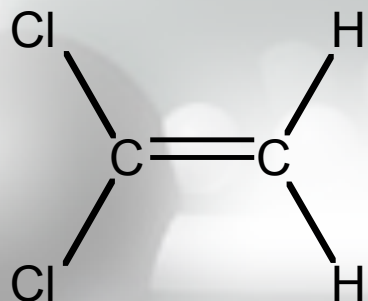
Build $C_2H_2Cl_2$

Cis-trans isomers - $C_2H_2Cl_2$

- Three distinct structures are possible.
- The following 2 are cis-trans isomers:



- The third is a structural isomer of the first two, but does not have cis-trans isomerism:



Structural Isomers

Build C_5H_{12}

Structural Isomers – C₅H₁₂

