

Covalent Bonding

The Nature of Covalent Bonding

- OBJECTIVES:

- Use electron dot structures to show the formation of single, double, and triple covalent bonds.

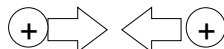
The Nature of Covalent Bonding

- OBJECTIVES:

- Describe and give examples of coordinate covalent bonding, resonance structures, and exceptions to the octet rule.

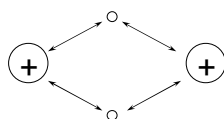
How does H₂ form?

- The nuclei repel



How does H₂ form?

- The nuclei repel
- But they are attracted to electrons
- They share the electrons

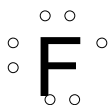


Covalent bonds

- Nonmetals hold on to their valence electrons.
- They can't give away electrons to bond.
- Still want noble gas configuration.
- Get it by sharing valence electrons with each other.
- By sharing, both atoms get to count the electrons toward a noble gas configuration.

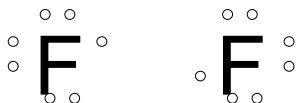
Covalent bonding

- Fluorine has seven valence electrons



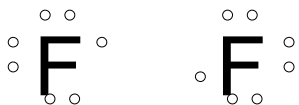
Covalent bonding

- Fluorine has seven valence electrons
- A second atom also has seven



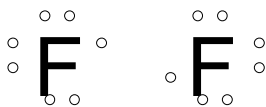
Covalent bonding

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- A second atom also has seven
- By sharing electrons...



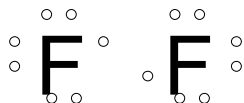
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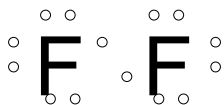
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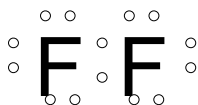
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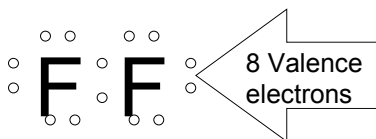
Covalent bonding

- Fluorine has seven valence electrons
- A second atom also has seven
- By sharing electrons...
- ...both end with full orbitals



Covalent bonding

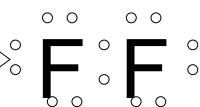
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8 Valence electrons



A Single Covalent Bond is...

- A sharing of two valence electrons.
- Only nonmetals and Hydrogen.
- Different from an ionic bond because they actually form molecules.
- Two specific atoms are joined.
- In an ionic solid, you can't tell which atom the electrons moved from or to.

How to show how they formed

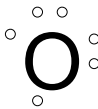
- It's like a jigsaw puzzle.
- You put the pieces together to end up with the right formula.
- Carbon is a special example - can it really share 4 electrons?
 - Electron promotion!
- Another example- show how water is formed with covalent bonds.

Water



Each hydrogen has 1 valence electron

Each hydrogen wants 1 more



The oxygen has 6 valence electrons

The oxygen wants 2 more

They share to make each other happy

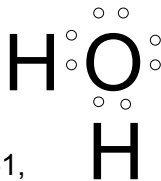
Water

- Put the pieces together
- The first hydrogen is happy
- The oxygen still wants one more



Water

- The second hydrogen attaches
- Every atom has full energy levels



Sample 16-1,
p.440
