

Unit 2: Molecular and Ionic Compound Structure and Properties

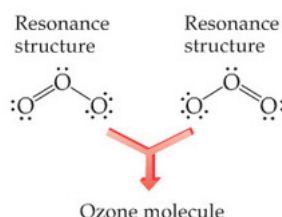
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- chemical bonds** the attractive forces that hold atoms together
- ionic bond** A chemical bond resulting from the attraction between oppositely charged ions.
- covalent bond** A chemical bond that involves sharing a pair of electrons between atoms in a molecule
- metallic bond** a bond formed by the attraction between positively charged metal ions and the electrons around them
- Lewis symbol** the representation of an atom that shows valence electrons as dots around the symbol of the element
- octet rule** States that atoms lose, gain or share electrons in order to acquire a full set of eight valence electrons
- lattice energy** the energy released when one mole of an ionic crystalline compound is formed from gaseous ions
- single bond** a covalent bond in which two atoms share one pair of electrons
- double bond** A covalent bond in which two pairs of electrons are shared between two atoms
- triple bond** a covalent bond in which two atoms share three pairs of electrons
- bond length** the average distance between the nuclei of two bonded atoms
- bond polarity** a measure of how equally or unequally the electrons in any covalent bond are shared
- polar covalent bond** A covalent bond in which electrons are not shared equally
- nonpolar covalent bond** a covalent bond in which the electrons are shared equally by the two atoms

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15. **Electronegativity** A measure of the ability of an atom in a chemical compound to attract electrons
16. **polar molecule** A molecule that has electrically charged areas.
17. **Dipole** created by equal but opposite charges that are separated by a short distance
18. **formal charge** The number of valence electrons in an isolated atom minus the number of electrons assigned to the atom in the Lewis structure
19. **resonance structure** one of the two or more equally valid electron dot structures of a molecule or polyatomic ion



20. **bond angle** the angle formed by two bonds to the same atom
21. **VSEPR theory** Valence-shell electron-pair repulsion theory; because electron pairs repel, molecules adjust their shapes so that valence electron pairs are as far apart as possible
22. **electron domain** in the VSEPR model, a region about a central atom in which an electron pair is concentrated
23. **bonding pair** an electron pair found in the space between two atoms
24. **nonbonding pairs** two paired valence electrons that tend not to participate in a chemical bond
25. **bond dipole** separation of electrical charge created when atoms with different electronegativities form a covalent bond
26. **hybrid orbitals** orbitals of equal energy produced by the combination of two or more orbitals on the same atom

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27. **Hybridization** the mixing of several atomic orbitals to form the same total number of equivalent hybrid orbitals
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28. **sp hybridization** linear; bond angle: 180
a type of bonding where the 2s orbital mixes with only one of the three p-orbitals resulting in two sp orbitals and two remaining unchanged p orbitals
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29. **sp² hybridization** 1. Trigonal planar structure
2. sp² hybridization creates 3 identical orbitals of intermediate energy and length and leaves one unhybridized p orbital
3. 3 effective pairs of electrons surround the carbon (double bond treated as one effective pair)
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30. **sp³ hybridization** A type of hybridization that results from the combination of the s orbital and all three p orbitals in the second energy level of carbon, resulting in four hybrid orbitals and occurs when a carbon atom is bonded to four other atoms. The geometric arrangement of those four hybrid orbitals is called tetrahedral.
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31. **sigma bond** a bond formed when two atomic orbitals combine to form a molecular orbital that is symmetrical around the axis connecting the two atomic nuclei
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32. **pi bond** a bond that is formed when parallel orbitals overlap to share electrons.
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33. **metallic solids** solids that have metal atoms occupying the crystal lattice and held together by metallic bonding
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34. **ionic solids** solids whose composite units are ions; they generally have high melting points
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35. **covalent network solids** solids in which the units that make up the three-dimensional network are joined by covalent bonds
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36. **molecular solids** solids whose composite units are molecules

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37. **crystalline solid** A solid that is made up of crystals in which particles are arranged in a regular, repeating pattern
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38. **amorphous solid** A solid made up of particles that are not arranged in a regular pattern
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39. **Alloys** a mixture composed of two or more elements, at least one of which is a metal
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40. **substitutional alloy** some of the host metal atoms are replaced by other metal atoms of similar sizes
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41. **interstitial alloy** a mixture formed when small atoms fill holes in a metallic crystal
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42. **electron sea model** Proposes that all metal atoms in a metallic solid contribute their valence electrons to form a "sea" of electrons, and can explain properties of metallic solids such as malleability, conduction, and ductility.
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