

Group A: Simple Lewis Dot Structures

Species	Lewis Dot Structure	Electron Pair Geometry	Molecular Shape	Polarity
F ₂	$\text{:}\ddot{\text{F}}-\ddot{\text{F}}\text{:}$	linear	linear	no
O ₂	$\text{:}\ddot{\text{O}}=\ddot{\text{O}}\text{:}$	"	"	"
N ₂	$\text{:}\ddot{\text{N}}\equiv\ddot{\text{N}}\text{:}$	"	"	"
HF	$\begin{array}{c} \text{H}-\ddot{\text{F}}\text{:} \\ \longleftarrow \end{array}$	"	"	yes
CO	$\begin{array}{c} \text{:}\ddot{\text{C}}\equiv\ddot{\text{O}}\text{:} \\ \longleftarrow \end{array}$	"	"	yes
CO ₂	$\begin{array}{c} \ddot{\text{O}}=\text{C}=\ddot{\text{O}} \\ \longleftarrow \quad \longrightarrow \end{array}$	"	"	no

Species	Lewis Dot Structure	Electron Pair Geometry	Molecular Shape	Polarity
NO ₂ ⁺	$\left[\overset{\cdot\cdot}{\underset{\cdot\cdot}{\text{O}}} = \text{N} = \overset{\cdot\cdot}{\underset{\cdot\cdot}{\text{O}}} \right]^+$	linear	linear	-----
CH ₄	$\begin{array}{c} \text{H} \\ \\ \text{H}-\text{C}-\text{H} \\ \\ \text{H} \end{array}$	tetrahedral	tetrahedral	no
SiH ₄	$\begin{array}{c} \text{H} \\ \\ \text{H}-\text{Si}-\text{H} \\ \\ \text{H} \end{array}$	"	"	"
NH ₃	$\begin{array}{c} \text{H} \\ \\ \text{H}-\text{N}-\text{H} \\ \\ \text{H} \end{array}$	"	trigonal pyramidal	yes
PH ₃	$\begin{array}{c} \text{H} \\ \\ \text{H}-\text{P}-\text{H} \\ \\ \text{H} \end{array}$	"	"	"
H ₂ O	$\begin{array}{c} \text{H} \\ \\ \text{H}-\text{O}-\text{H} \\ \\ \text{H} \end{array}$	"	bent	"
H ₂ S	$\begin{array}{c} \text{H} \\ \\ \text{H}-\text{S}-\text{H} \\ \\ \text{H} \end{array}$	"	"	"

Group B: Resonance

Species	Lewis Dot Structure	Electron Pair Geometry	Molecular Shape	Polarity
O ₃	$\begin{array}{c} \ddot{O} = \ddot{O} - \ddot{O} : \\ \updownarrow \\ : \ddot{O} - \ddot{O} = \ddot{O} \end{array}$	Trigonal Planar	bent	no
N ₂ O	$\begin{array}{c} \ddot{N} = N = \ddot{O} \\ \updownarrow \\ \ddot{N} \equiv N - \ddot{O} : \\ \updownarrow \\ :\ddot{N} - N \equiv \ddot{O} : \end{array}$	linear	linear	yes
NO ₂ ⁻	$\begin{array}{c} [: \ddot{O} - \ddot{N} = \ddot{O}]^- \\ \updownarrow \\ [\ddot{O} = \ddot{N} - \ddot{O} :]^- \end{array}$	trigonal planar	bent	-----
NO ₃ ⁻	$\begin{array}{c} [\ddot{O} - N = \ddot{O}]^- \leftrightarrow [\ddot{O} = N - \ddot{O}]^- \\ \updownarrow \\ [\ddot{O} - N - \ddot{O}]^- \\ \updownarrow \\ [\ddot{O} = N = \ddot{O}]^- \end{array}$	trigonal planar	Trigonal planar	-----
CO ₃ ²⁻	$\begin{array}{c} [O = C = O]^- \leftrightarrow [O = C - O]^- \\ \updownarrow \\ [O - C - O]^- \\ \updownarrow \\ [O = C = O]^- \end{array}$	"	"	-----
OCN ⁻	$\begin{array}{c} [\ddot{O} = C = \ddot{N}]^- \\ \updownarrow \\ [\ddot{O} - C \equiv \ddot{N}]^- \\ \updownarrow \\ [: \ddot{O} \equiv C - \ddot{N} :]^- \end{array}$	linear	linear	-----

Species	Lewis Dot Structure	Electron Pair Geometry	Molecular Shape	Polarity
CNO ⁻	$\begin{array}{c} \left[\overset{\cdot\cdot}{\text{C}} = \overset{\cdot\cdot}{\text{N}} = \overset{\cdot\cdot}{\text{O}} \right] \\ \updownarrow \\ \left[\overset{\cdot\cdot}{\text{C}} \equiv \overset{\cdot\cdot}{\text{N}} - \overset{\cdot\cdot}{\text{O}} \right]^- \\ \updownarrow \\ \left[\overset{\cdot\cdot}{\text{C}} - \overset{\cdot\cdot}{\text{N}} \equiv \overset{\cdot\cdot}{\text{O}} \right]^- \end{array}$	linear	*linear	-----
HNO ₃	$\begin{array}{c} \text{H} - \overset{\cdot\cdot}{\text{O}} - \overset{\cdot\cdot}{\text{N}} - \overset{\cdot\cdot}{\text{O}} \\ \quad \quad \quad \parallel \\ \quad \quad \quad \text{O} \\ \updownarrow \\ \text{O} - \overset{\cdot\cdot}{\text{N}} - \text{O} - \text{H} \\ \quad \quad \quad \parallel \\ \quad \quad \quad \text{O} \end{array}$ <p>+ others</p>	trigonal planar (@ N)	trigonal planar	yes
HCO ₃ ⁻	$\left[\text{H} - \overset{\cdot\cdot}{\text{O}} - \overset{\cdot\cdot}{\text{C}} - \overset{\cdot\cdot}{\text{O}} \right]^-$ <p style="margin-left: 40px;"> O</p> <p>+ others</p>	" @ Carbon	"	-----
C ₃ H ₅ ⁺	$\begin{array}{c} \left[\overset{\text{H}}{\text{C}} \equiv \overset{\text{H}}{\text{C}} - \overset{\text{H}}{\text{C}} - \text{H} \right]^+ \\ \quad \quad \quad \updownarrow \\ \left[\overset{\text{H}}{\text{C}} = \overset{\text{H}}{\text{C}} = \overset{\text{H}}{\text{C}} \right]^+ \end{array}$	-----	-----	-----

Group C: Expanded Octet

Species	Lewis Dot Structure	Electron Pair Geometry	Molecular Shape	Polarity
PCl ₅		Trigonal bipyramidal	trigonal bipyramidal	NO
PF ₆ ⁻		octahedral	octahedral	-----
SF ₄		Trigonal bipyramidal	seesaw	yes
SF ₆		octahedral	octahedral	no
ClF ₃		Trigonal bipyramidal	T-shaped	yes
I ₃ ⁻		Trigonal bipyramidal	linear	-----

Species	Lewis Dot Structure	Electron Pair Geometry	Molecular Shape	Polarity
IF_4^-		octahedral	square planar	-----
IF_5		octahedral	square pyramidal	yes
XeF_2		Trigonal Bipyramidal	linear	no
XeF_4		octahedral	square planar	no

Group D: Radicals and Electron-Deficient Species

Species	Lewis Dot Structure	Electron Pair Geometry	Molecular Shape	Polarity
BH ₃	$\begin{array}{c} \text{H}-\text{B}-\text{H} \\ \\ \text{H} \end{array}$	Trigonal planar →		no
NO	$\overset{\cdot\cdot}{\text{N}}=\overset{\cdot\cdot}{\text{O}}$	linear →		yes
NO ₂	$\begin{array}{c} \overset{\cdot\cdot}{\text{O}}=\overset{\cdot}{\text{N}}-\overset{\cdot\cdot}{\text{O}} \\ \downarrow \\ \overset{\cdot\cdot}{\text{O}}-\overset{\cdot}{\text{N}}=\overset{\cdot\cdot}{\text{O}} \end{array}$	trigonal planar	bent	yes
B ₂ H ₆	$\begin{array}{ccccc} & \text{H} & & \text{H} & \\ & & & & \\ \text{H} & -\text{B} & - & \text{B} & -\text{H} \\ & & & & \\ & \text{H} & & \text{H} & \end{array}$	X	X	X
BF ₃	$\begin{array}{c} \overset{\cdot\cdot}{\text{F}}-\text{B}-\overset{\cdot\cdot}{\text{F}} \\ \\ \overset{\cdot\cdot}{\text{F}} \end{array}$	Trigonal Planar →		no
Al ₂ Br ₆	$\begin{array}{ccccc} \overset{\cdot\cdot}{\text{Br}} & & \overset{\cdot\cdot}{\text{Br}} & & \overset{\cdot\cdot}{\text{Br}} \\ & \diagdown & / & \diagdown & / \\ & \text{Al} & - & \text{Al} & \\ & / & \diagup & / & \diagdown \\ \overset{\cdot\cdot}{\text{Br}} & & \overset{\cdot\cdot}{\text{Br}} & & \overset{\cdot\cdot}{\text{Br}} \end{array}$	X	X	X

Group E: Expanded Octet and Resonance

Species	Lewis Dot Structure	Electron Pair Geometry	Molecular Shape	Polarity
SO ₂	$\begin{array}{c} \text{:}\ddot{\text{O}}-\ddot{\text{S}}=\ddot{\text{O}} \\ \downarrow \\ \text{:}\ddot{\text{O}}=\ddot{\text{S}}-\ddot{\text{O}}\text{:} \end{array}$	trigonal planar	bent	yes
SO ₃	$\begin{array}{c} \text{:}\ddot{\text{O}}=\ddot{\text{S}}=\ddot{\text{O}} \\ \uparrow \\ \text{:}\ddot{\text{O}} \\ \text{:}\ddot{\text{O}}=\ddot{\text{S}}=\ddot{\text{O}}\text{:}^* \\ \uparrow \\ \text{:}\ddot{\text{O}}\text{:} \end{array}$	"	trigonal planar	no
SO ₄ ²⁻	$\left[\begin{array}{c} \text{:}\ddot{\text{O}} \\ \text{:}\ddot{\text{O}}=\ddot{\text{S}}=\ddot{\text{O}} \\ \text{:}\ddot{\text{O}} \end{array} \right]^{2-} \text{ and others}$ $\left[\begin{array}{c} \text{:}\ddot{\text{O}} \\ \text{:}\ddot{\text{O}} \\ \text{:}\ddot{\text{O}} \\ \text{:}\ddot{\text{O}} \\ \text{:}\ddot{\text{O}} \\ \text{:}\ddot{\text{O}} \\ \text{:}\ddot{\text{O}} \\ \text{:}\ddot{\text{O}} \\ \text{:}\ddot{\text{O}} \\ \text{:}\ddot{\text{O}} \end{array} \right]^{2-}$	tetrahedral	tetrahedral	-----
HSO ₄ ⁻	$\left[\begin{array}{c} \text{:}\ddot{\text{O}} \\ \text{:}\ddot{\text{O}}=\ddot{\text{S}}=\ddot{\text{O}} \\ \text{:}\ddot{\text{O}} \\ \text{:}\ddot{\text{O}} \\ \text{H} \end{array} \right]^{-} \text{ and others}$	"	"	-----
POCl ₃	$\begin{array}{c} \text{:}\ddot{\text{O}} \\ \text{:}\ddot{\text{Cl}}-\text{P}(\text{O})-\text{Cl}\text{:} \\ \text{:}\ddot{\text{Cl}}\text{:} \\ \text{:}\ddot{\text{Cl}}\text{:} \end{array} \text{ and others}$	tetrahedral	→	yes
ClO ₄ ⁻	$\left[\begin{array}{c} \text{:}\ddot{\text{O}} \\ \text{:}\ddot{\text{O}} \\ \text{:}\ddot{\text{O}} \\ \text{:}\ddot{\text{O}} \\ \text{:}\ddot{\text{O}} \\ \text{:}\ddot{\text{O}} \\ \text{:}\ddot{\text{O}} \\ \text{:}\ddot{\text{O}} \end{array} \right]^{-} \text{ and others}$	"	→	-----