8.5 Magnesium ([Ne]$3s^2$) can achieve the electron configuration of the nearest noble gas (Ne) by losing only two electrons: Mg^{2+} $1s^2 2s^2 2p^6$. Magnesium will not form the Mg^{3+} ion because an extremely high amount of energy would be required to break into the $2s^2 2p^6$ core to remove an electron.

8.6 When chlorine gains one electron to form Cl^-, it has filled an orbital and achieved a noble gas configuration. To make the Cl^{2-} ion, an electron would have to be placed in the next higher shell. The amount of energy required for this to occur is extremely high and makes the creation of a Cl^{2-} ion energetically unfavorable.

8.7 Many of the transition metals in Period 4 have an $4s^2$ outer-shell electron configuration. Since these characteristically are the first electrons to be lost when a transition metal atom is ionized, it is common that a 2+ ion should be formed.

8.10 The valence electrons are primarily responsible for chemical bonds.

8.11 (a) correct
(b) incorrect
(c) correct
(d) incorrect

8.20 (a) single bond: a covalent bond formed by the sharing of one pair of electrons.
(b) double bond: a covalent bond formed by the sharing of two pairs of electrons.
(c) triple bond: a covalent bond formed by the sharing of three pairs of electrons.

8.22 Since the outer shell (or valence shell) of hydrogen can hold only two electrons, hydrogen is not said to obey the octet rule. It does, however, readily satisfy its requirement for a closed shell electron configuration through the formation of one covalent bond.

8.29 Fluorine has the largest electronegativity, whereas oxygen has the second largest electronegativity.

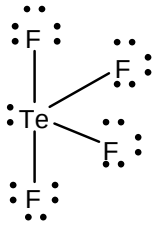
8.58 Bi^{3+}: [Xe]$6s^2 4f^{14} 5d^{10}$
Bi^{5+}: [Xe]$4f^{14} 5d^{10}$

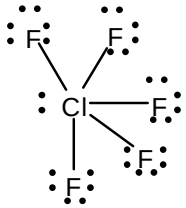
8.60 Co^{3+}: [Ar]$3d^6$ 4 unpaired electrons

8.78 (a) I (b) I (c) F (d) N

8.84 (a) 26 (b) 24 (c) 24 (d) 32

8.86 (a) (b)





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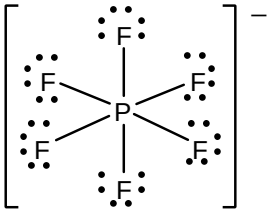

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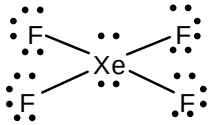

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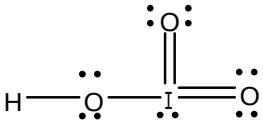

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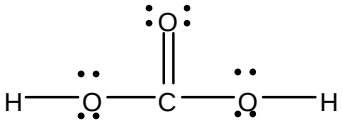

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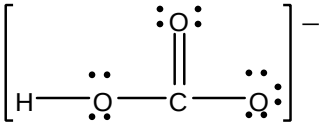

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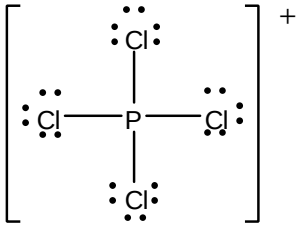

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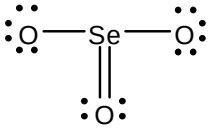

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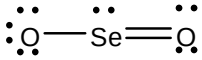

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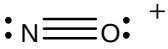

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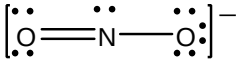

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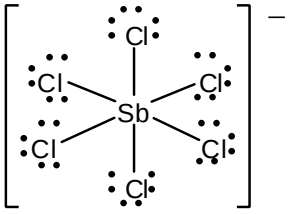

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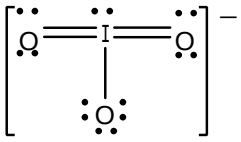

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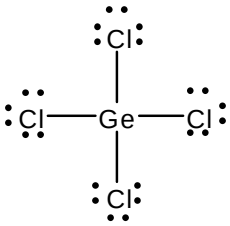

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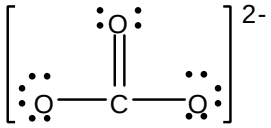

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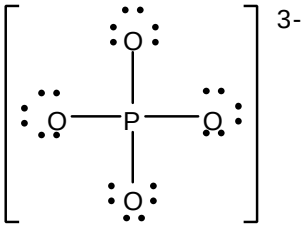

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