Determining a Lewis Structure: Some Tricks/Guidelines

Several parameters of a valid Lewis structure can be calculated from just the chemical formula of a substance. These “rules” will work as long as you are dealing with a compound that obeys the octet rule.

Calculate the following attributes:

“Electrons needed” = \(N = 8 \times \text{(# of non-hydrogen atoms)} + 2 \times \text{(# of hydrogen atoms)}\)

“Electrons you have” = \(H = \text{Sum of the number of valence electrons} + \text{charge adjustment}\)

Then you can use these numbers to learn about the number of bonds and lone pairs for the correct Lewis structure(s):

“Shared electrons” = \(S = \text{subtract “Electrons you have” from “Electrons needed”} = N - H\)

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\text{Divide this number by 2} = \text{the number of bonds in the Lewis structure}
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“Nonbonded Electrons” = subtract “Shared electrons” from “Electrons you have” = \(H - S\)

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\text{Divide this number by 2} = \text{the number of lone pairs in the Lewis structure}
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