

## Oxidation States (OS) or Oxidation Numbers (ON)

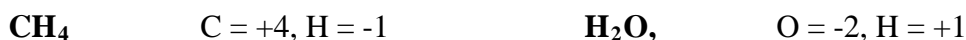
The oxidation state is a "measure of the degree of oxidation of an atom in a substance" and it is the fundamental key to understanding redox reactions, reaction mechanisms, catalysis, etc. It is the charge an atom in a compound would have if the bonding were completely ionic.

From: J. Am. Chem. Soc., Article ASAP DOI: 10.1021/ja3029119

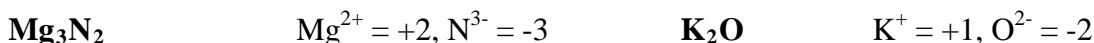
Publication Date (Web): May 4, 2012

### • Oxidation State:

"Fictitious" charge for an element that is covalently bonded:

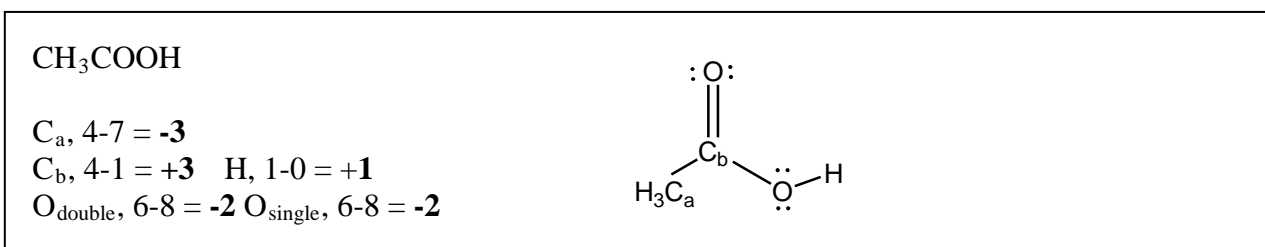
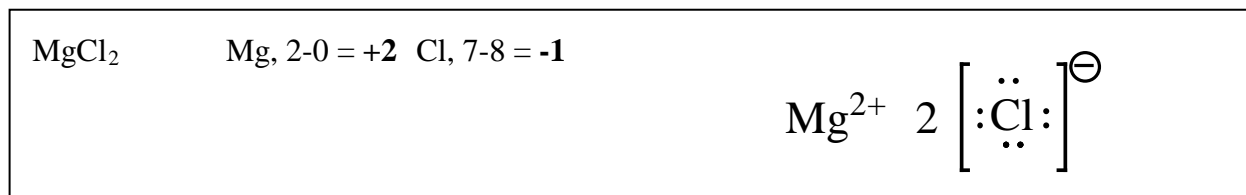
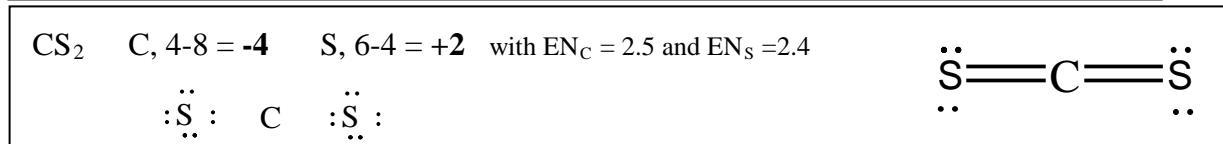
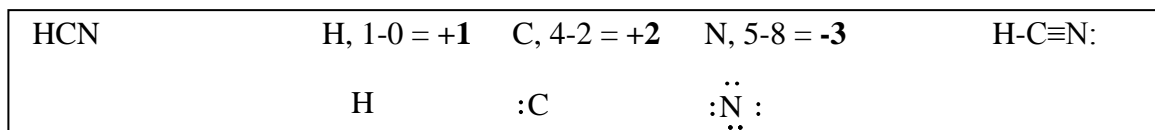


Actual charge for an element that is ionically bonded:



### • How to get OS:

- 1) Given a compound, write its Lewis dot structure.
- 2) For each separate bond decide which element is most electronegative (EN).
- 3) Give the most EN element all the electrons of that bond. If the atoms in the bond are the same, give each element half of the electrons.
- 4) When all electrons have been assigned subtract the number of electrons on each atom from the valence of each element to get the oxidation state (number).



If you would like a more simple rule set for assigning oxidation states (numbers) see page 586 in Zumdahl-Decoste.