1.5: In-Text References

1. If you did not take the CLUE general chemistry curriculum, we recommend that you take a look at the materials on the web here. ↵

2. Here the nomenclature can be confusing, since when in solution HCl, $NaCl$, and $NaOH$ exist primarily in their dissociated forms, i.e. H^+ and Cl^-, Na^+ and Cl^-, and Na^+ and OH^-. ↵

3. In fact, later on we will use abbreviated notation to indicate the transfer of H^+ from one molecule to another simply because there are so many reactions in which multiple proton transfers take place. However, you should always be aware that protons are always transferred (not simply ionized or dropped off). ↵

4. We will have MUCH more to say about arrow pushing as we proceed, but it is good to get a head start on this skill. ↵

5. The situation is similar to when we use different atomic and molecular structure models depending on our purpose. The most sophisticated of these models are based on quantum mechanical calculations, but in many cases, producing a calculated model (which considers each and every atom in a system) may be impossible or not even particularly useful; when a simpler model is adequate it makes sense to use it. As an example, when considering bonding within molecules we typically use the valence bond (VB) model in which we think of each bond as composed of two electrons that are attracted to both of the atomic nuclei involved in the bond. Alternatively we could use molecular orbital (MO) model, in which we consider bonding (and anti-bonding) orbitals that involve the entire molecule. Each MO contains a maximum of two electrons and the bonding interactions are considered over the whole molecule. While useful in certain contexts, the MO model is usually unnecessarily complex for everyday use. As we will see shortly, there are situations when we will choose to use one or another, or both models of bonding, depending on the circumstances. ↵

6. Whether a mule or a hinny is produced from such a cross depends upon whether the horse in the mother or father and is due primarily to parental imprinting of genes expression within the placenta: http://www.ncbi.nlm.nih.gov/pubmed/23754418 ↵

7. Please excuse this analogy, since hinnys and mules are typically sterile and so do not represent species: https://en.Wikipedia.org/wiki/Mule#Fertility ↵

8. There are 20 naturally occurring amino acids that are encoded for by the genetic code (actually there are 22 but selenocysteine and pyrrolysine are used only in a very few microbes). ↵

9. The implication is that we can take pure acetic acid (known as glacial acetic acid) which is 17.4 Moles/L and add any amount of water and have a solution of acetic acid in water (or perhaps water in acetic acid, depending on the relative amounts of two compounds). ↵

10. For fuller explanation of this phenomenon, you should review the chapter in CLUE on solubility (chapter 6). ↵

11. In a micelle, the non-polar groups are oriented towards the center of the structure while the ionic "heads" are in contact with the water solvent. ↵

12. Nitrogenous compounds with non-available lone pairs include ammonium salts (where the N is bonded to four other atoms), and aromatic heterocyclic compounds, where the lone pair is part of the aromatic pi system. ↵

13. In fact $AlCl_3(l)$ exists as a dimers Al_2Cl_6, but this structure decomposes and then reacts as $AlCl_3$ in the presence of a Lewis base. Diborane B_2H_6 is also a dimer of BH_3, that will break apart to react as BH_3. ↵

14. In general transition metal complexes and ions have empty d orbitals that are energetically accessible. ↵

15. If there are pi bonds present the substance is not an alkane – we will get to that presently ↵

16. There is an excellent (but simple) video on the mechanism of reactions that produce flames such as this one. https://vimeo.com/40271657 ↵

17. In fact there is a great deal of interest in controlling this reaction—that is, finding ways to take hydrocarbons and selectively introducing a functional group—rather than fully oxidizing the hydrocarbon. http://pubs.acs.org/doi/full/10.1021...entsci.6b00139 ↵

18. Another very important factor in understanding nucleophile strength is the structure of the solvent. We will return to this idea later. ↵