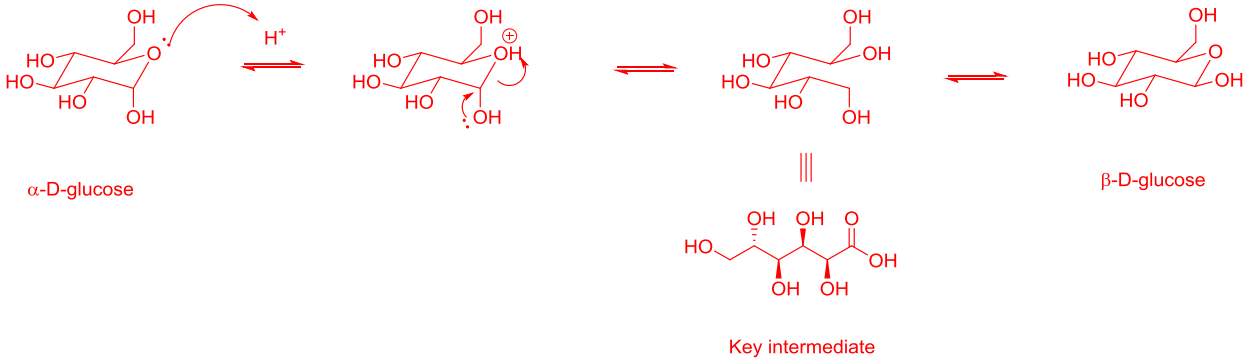
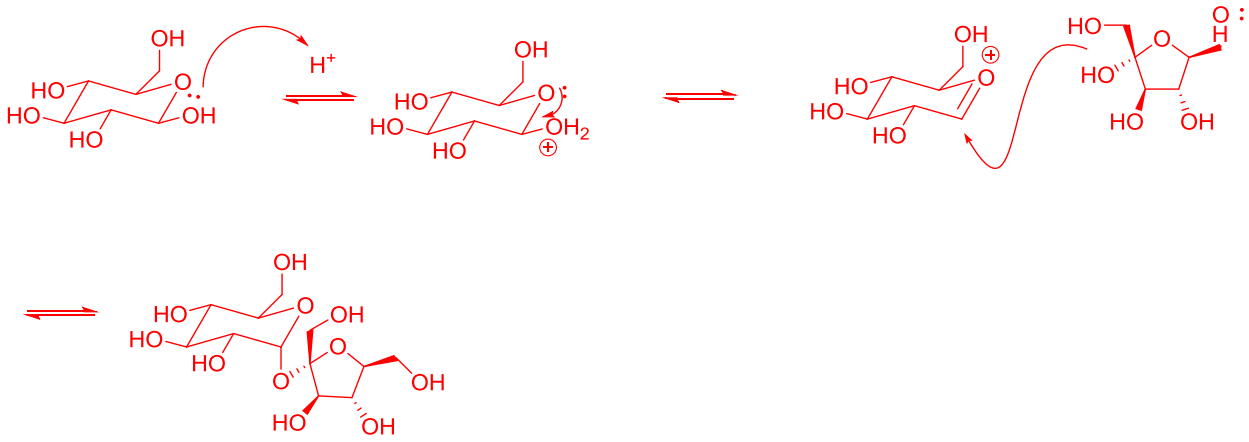
CHM2123 Problem Set #5 – Oxidation and synthesis of acetals

1. Anomerization is the process in which α-D-glucose is converted to β-D-glucose.
    a. Give the mechanism of anomerization.
    b. Draw the structure of the key intermediate that makes anomerization possible.
    c. Postulate an explanation as to why β-D-glucose is more stable than α-D-glucose.

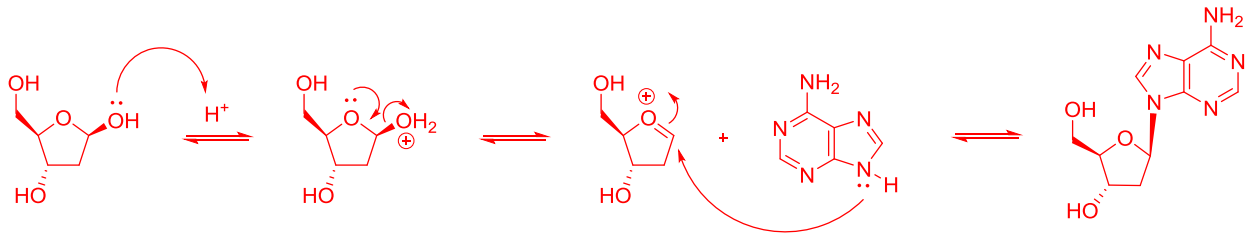


β-D-glucose is more stable than α-D-glucose because all the hydroxyl groups are equatorial

2. Sucrose is a dimer of glucose and fructose. Give the mechanism for the formation of sucrose from its monomers.



3. DNA is composed of a nucleotide base and a sugar (deoxyribose). The mechanism of formation is similar to acetals. Provide the mechanism for the reaction of deoxyribose with adenine.



4. An experiment in CHM1321 involves forming an acetal using 2-methoxypropene and a diol. Provide the mechanism and product for the reaction.