Paper #1: "Reduction of Benzaldehyde to Benzyl Alcohol"
Chem 228 / WS-2008
(Due week of 2/27-2/28)

In preparation for synthesis of fragrance compounds, this paper is to help familiarize you with some of the reactions involved and some of the library sources for this type of information. Since more than one type of reduction may be used, familiarity with some of the common options will be useful in selecting the best reagent.

Library sources listed below, will be consulted for information about the reduction reactions to be performed in the synthesis project portion of lab. The written paper should be no more than 5 pages typewritten, 12 pt. times new roman, double spaced, both left and right justified. Standard tense is 3rd person. An abstract of no more than 100 words should summarize the paper.

I have no objection to cooperation in acquiring the background information from the library, however your writeup is not to be a cooperative effort. Plagiarism is also unacceptable.

Topics to be covered must include:

1. Purification of benzaldehyde.

   What are the main expected impurities? How to determine purity?

2. Cannizzaro reaction & crossed Cannizzaro reactions.

   Mechanism, effect of solvent and structure of substrate on rate, yield, structural limitations, side reactions, hazards

3. Borohydride reduction

   Mechanism, solvent effects, effect of substrate structure on rate, yield, side reactions, hazards

4. Your reagent choice based on comparison of yields, cost, ease of product isolation, safety, etc.

Literature sources: (found in the MS&T library under the following call numbers)

1. Armarego, W., *Purification of Laboratory Chemicals*, 4th ed, **MST REF TP156.P83 P47 1997**
2. *Organic Reactions*, v.2, 94 (1944) **QD251.07** (on reserve for chem. 228)
3. Herbert C. Brown, New Selective Reducing Agents, *J Chem Ed*, **1961** 38(4), 173-179 **QD1.J93**
4. Organic textbooks-a source for reaction mechanisms, etc.
5. If any other sources are used, they should be cited in proper bibliographic format.