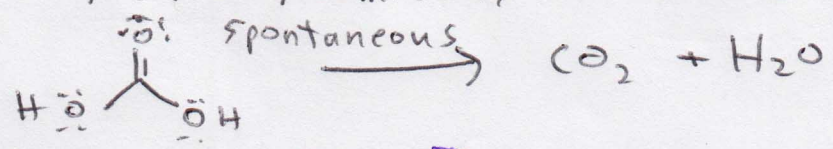


Synthesis of amines

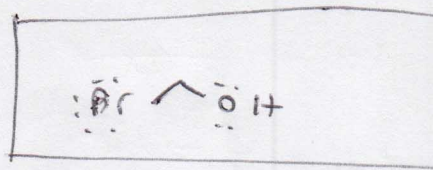
- 1) SN2 from alkyl halides [8.3]
- 2) reduction of alkyl azides [8.3]
- 3) hydrogenation of nitriles [17.19]
- 4) reduction of amides [18.6]
- 5) reduction of imines [20.2]
- 6) reductive amination [18.8]
- 7) Gabriel synthesis [17.8]
- 8) reduction of nitro [16.1]
- 9) Curtius + Hoffman rearrangements

Hoffman elimination
Aromatic amines

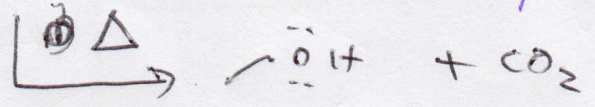
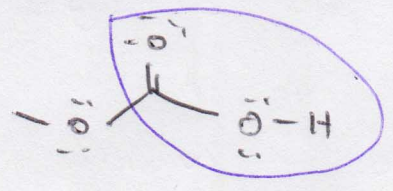
Thermodynamically unstable carboxylic acids



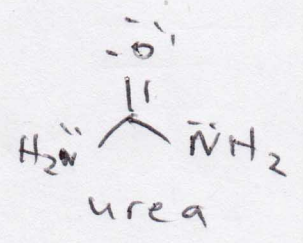
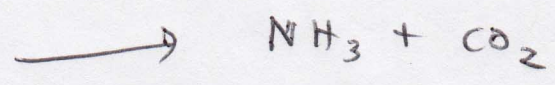
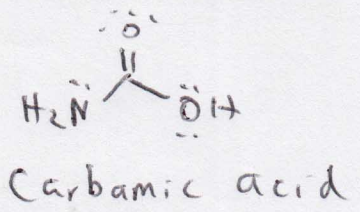
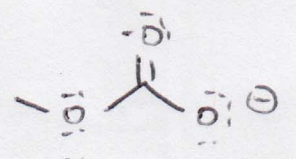
carbonic acid

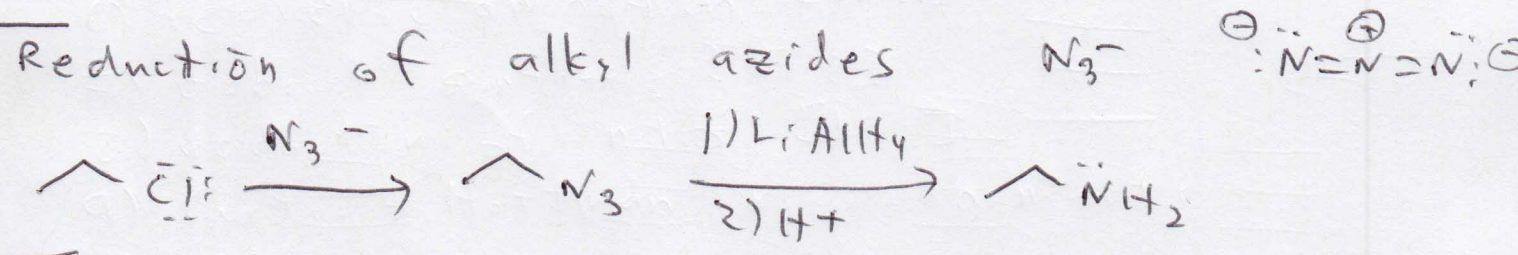
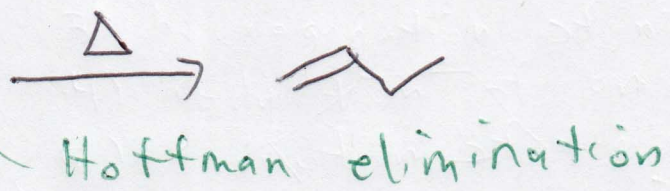
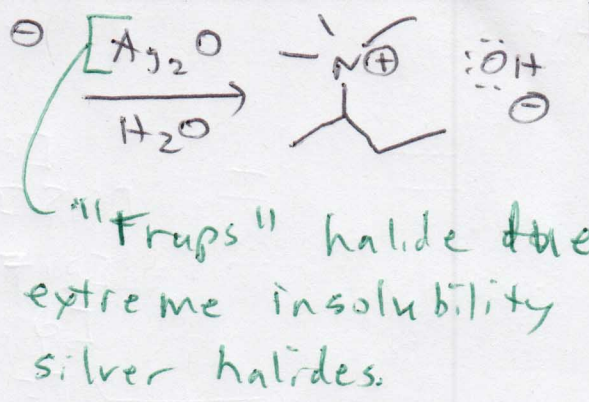
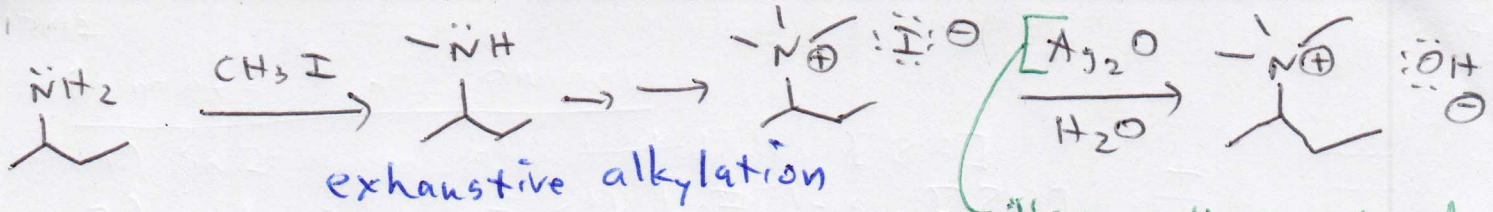


In many cases in which a carbonyl is part of a carboxylic acid and has a heteroatom also attached, the acid will decarboxylate

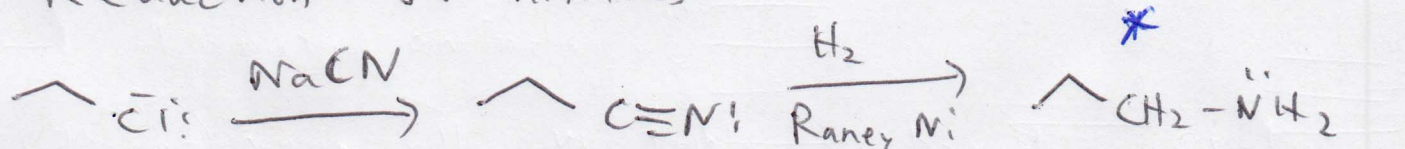


Carboxylic acid salts, however, are stable.



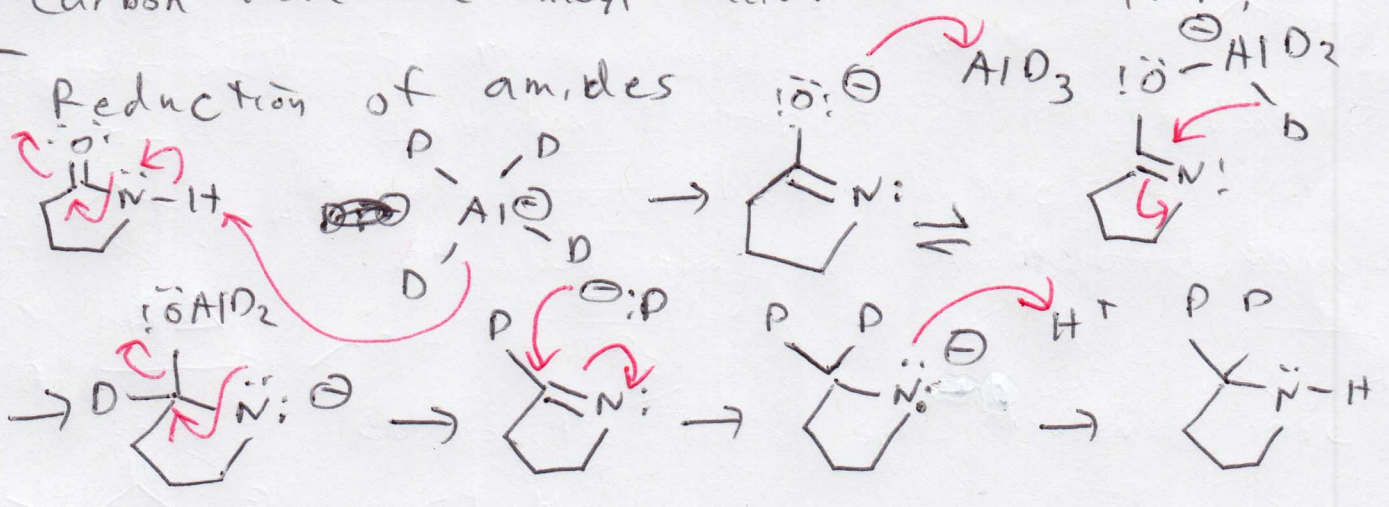


Reduction of nitriles

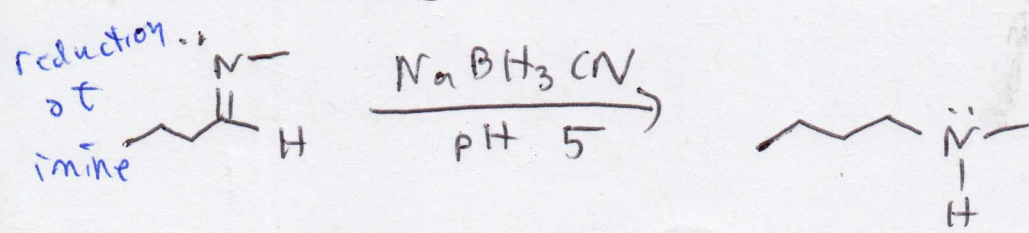
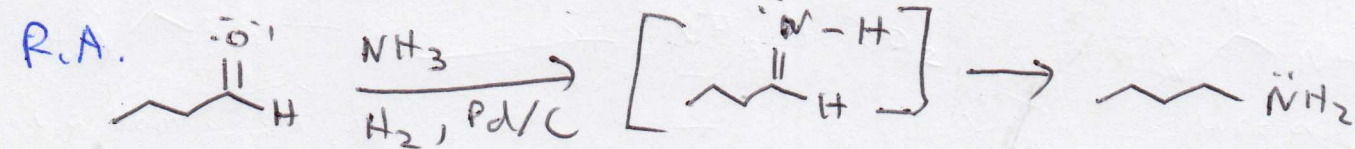


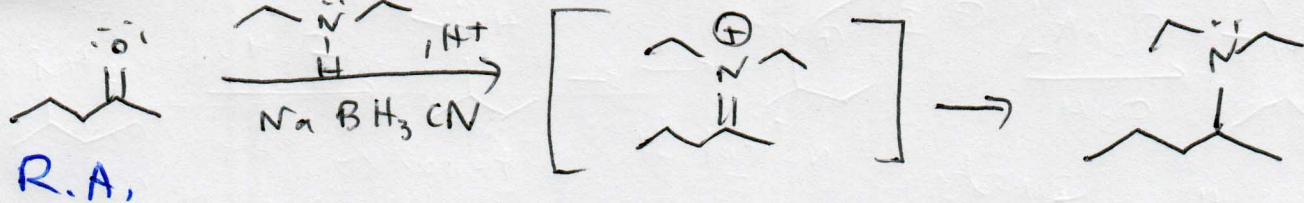
* Notice that the product contains one more carbon than the alkyl halide it came from.

Reduction of amides

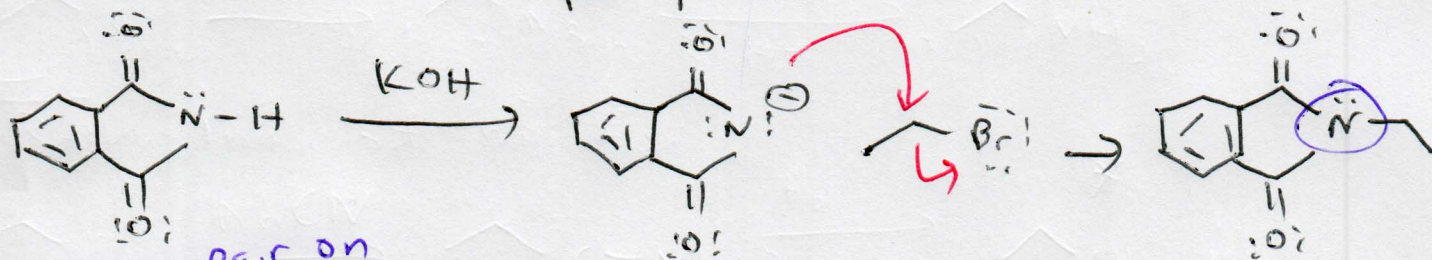
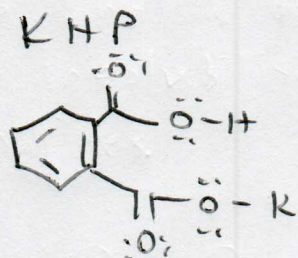
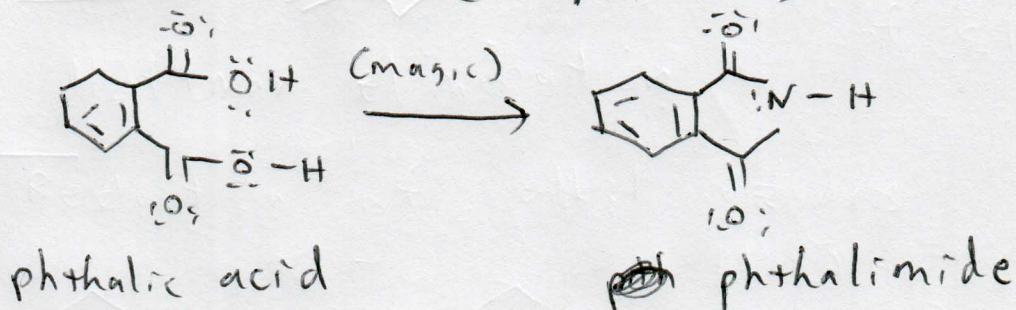


reduction of imines + reductive amination



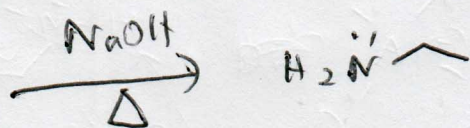


Gabriel amine synthesis



lone pair on N

The nitrogen is so heavily delocalized with the adjacent carbonyls that it is not basic enough (not nucleophilic enough) to undergo $\text{S}_{\text{N}}2$, \therefore Multiple alkylation does not occur.



Reduction of nitro compounds

