

**B.Sc. Semester-VI
Organic Chemistry
Paper-XIV**

3. Heterocyclic Compounds

Coverage:

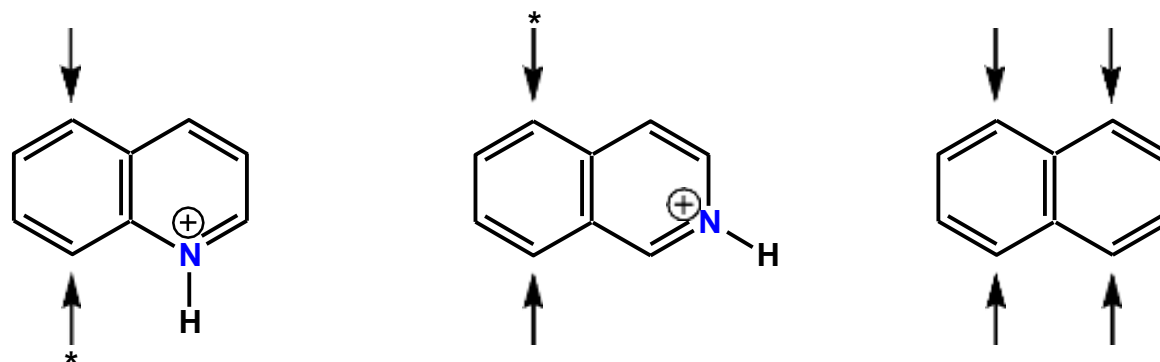
15. Quinolines and Isoquinolines : Electrophilic Reactions, Nucleophilic Reactions



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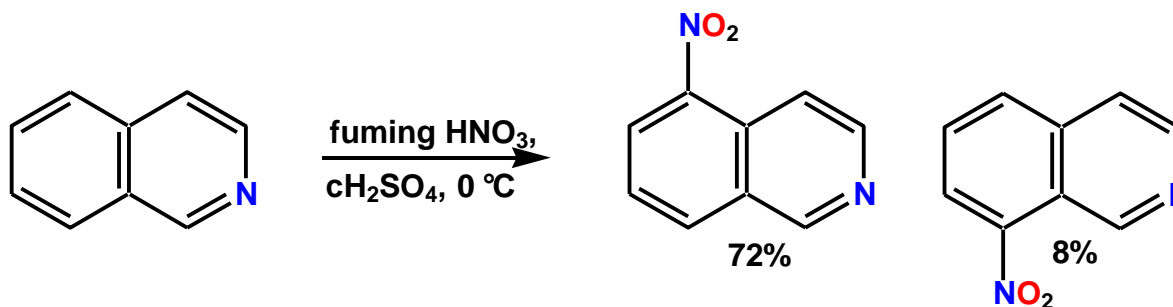
Quinolines/Isoquinolines – Electrophilic Reactions

Regiochemistry



- Under strongly acidic conditions, reaction occurs *via* the ammonium salt
- Attack occurs at the benzo- rather than hetero-ring
- Reactions are faster than those of pyridine but slower than those of naphthalene

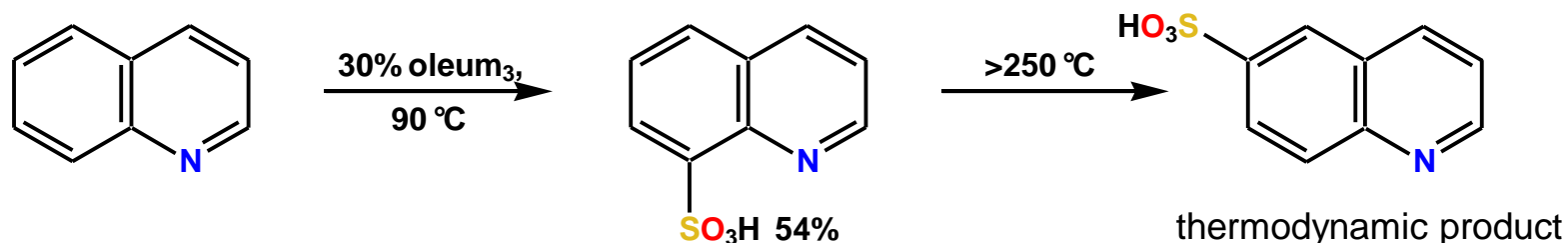
Nitration



- In the case of quinoline, equal amounts of the 5- and 8-isomer are produced

Quinolines/Isoquinolines – Electrophilic Reactions

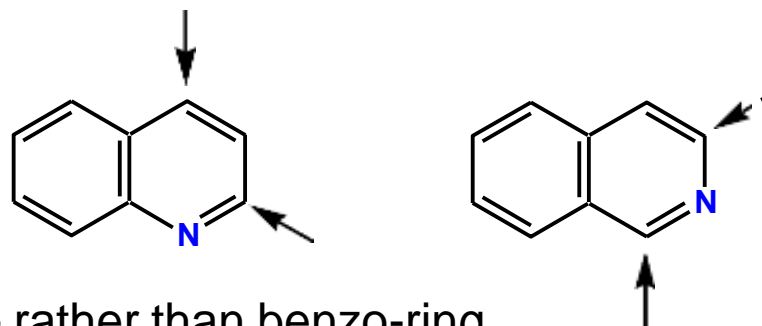
Sulfonation



- Halogenation is also possible but product distribution is highly dependent on conditions
- It is possible to introduce halogens into the hetero-ring under the correct conditions
- Friedel-Crafts alkylation/acylation is not usually possible

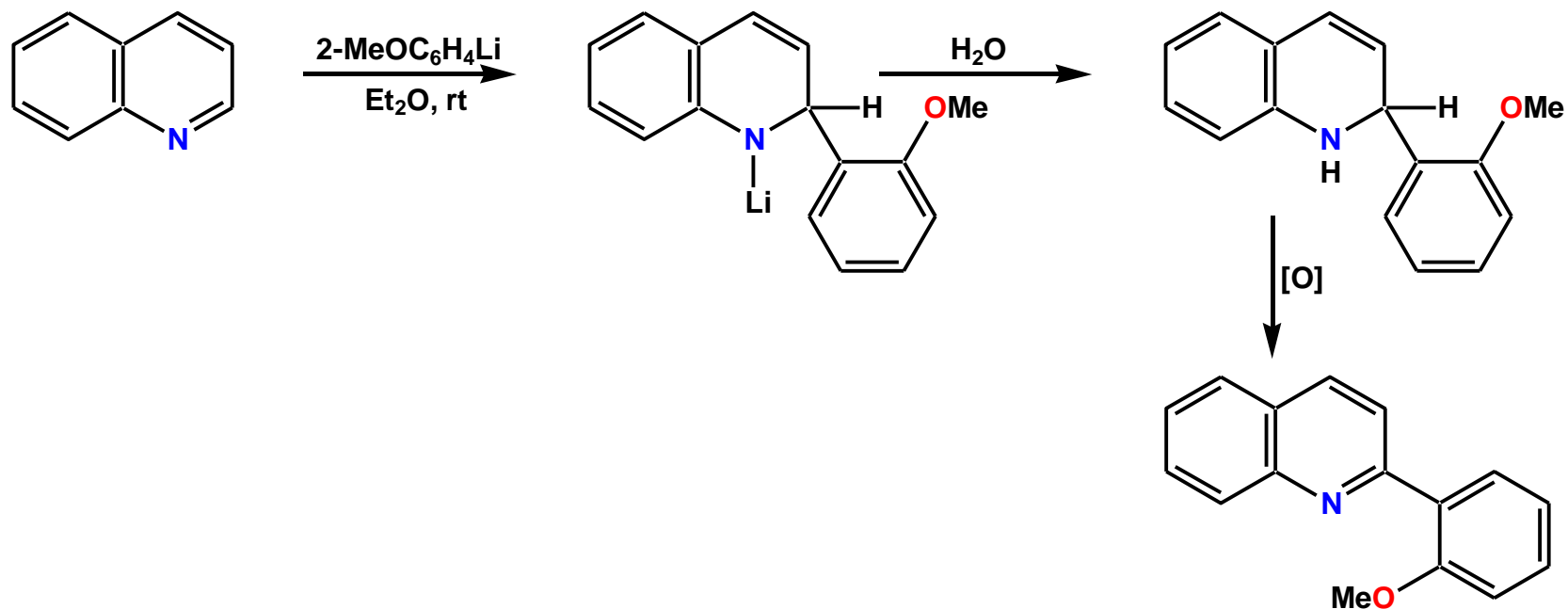
Quinolines/Isoquinolines – Nucleophilic Reactions

Regiochemistry

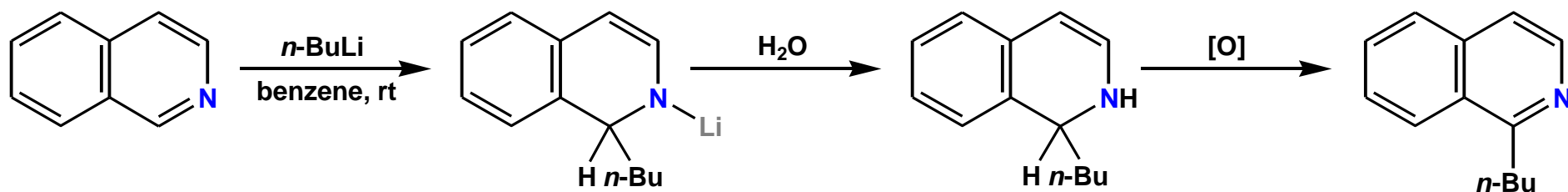


- Attack occurs at hetero- rather than benzo-ring
- They are generally more reactive than pyridines to nucleophilic attack

Carbon Nucleophiles

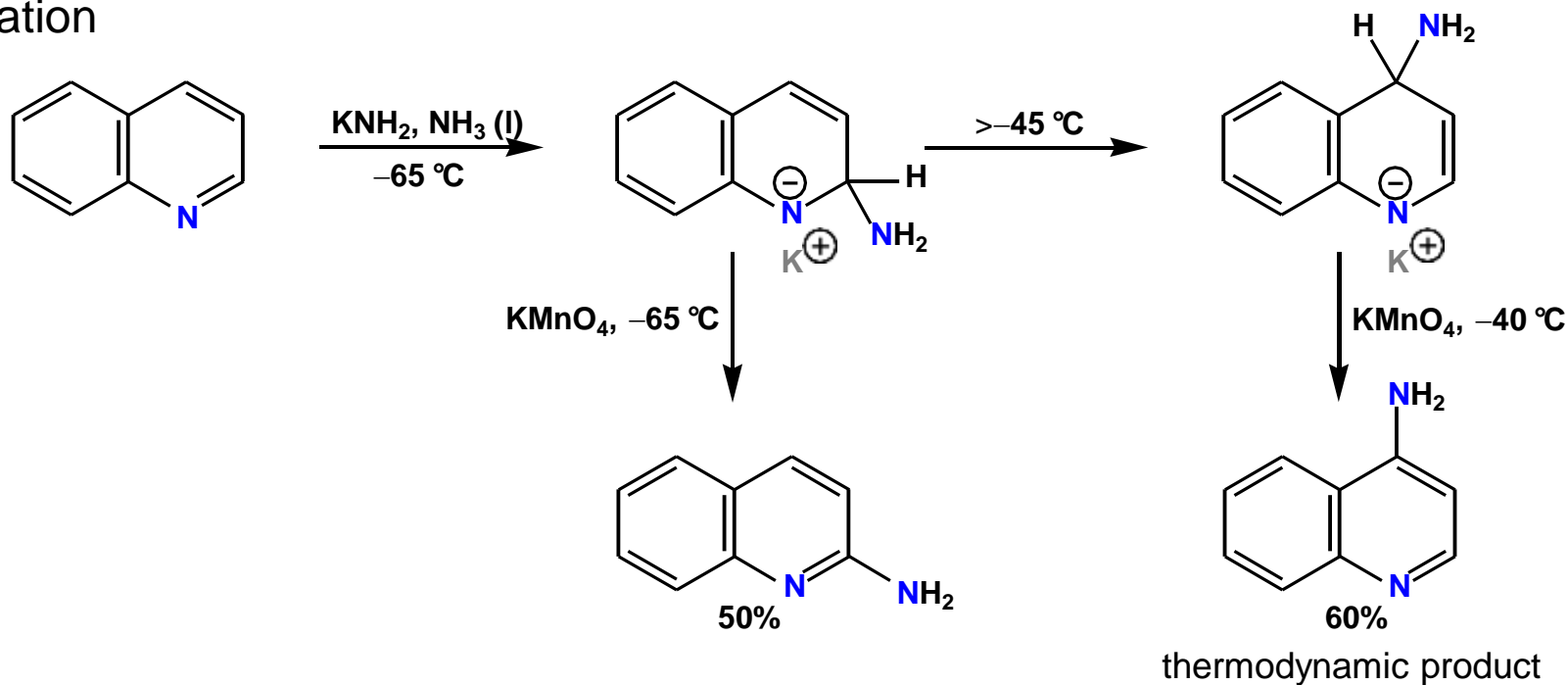


Quinolines/Isoquinolines – Nucleophilic Reactions



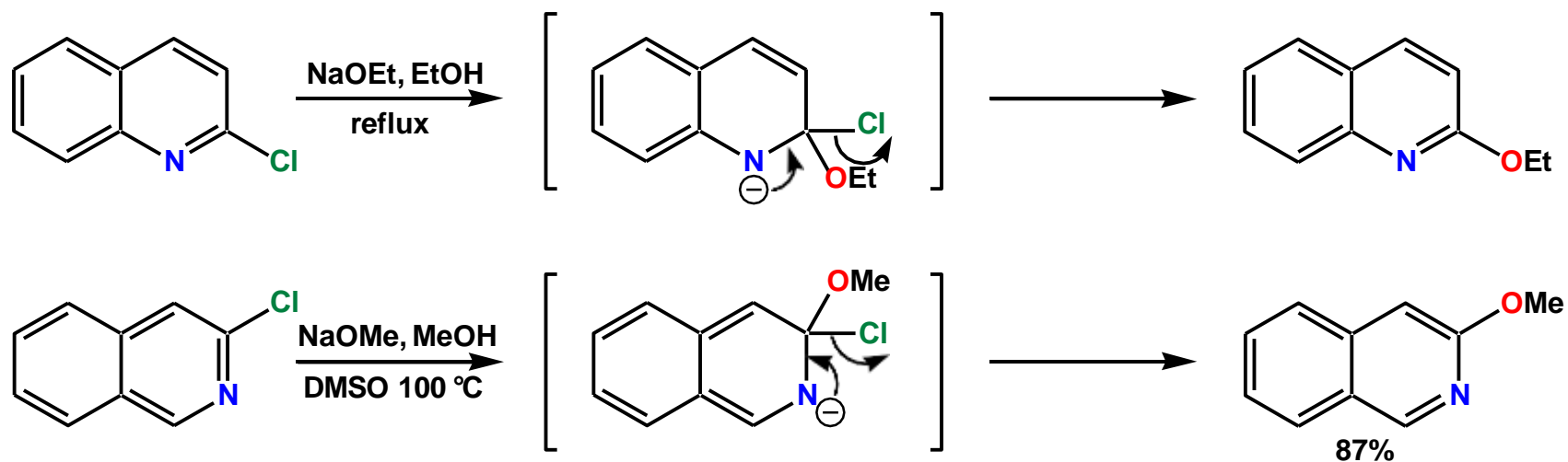
- Oxidation is required to regenerate aromaticity

Amination

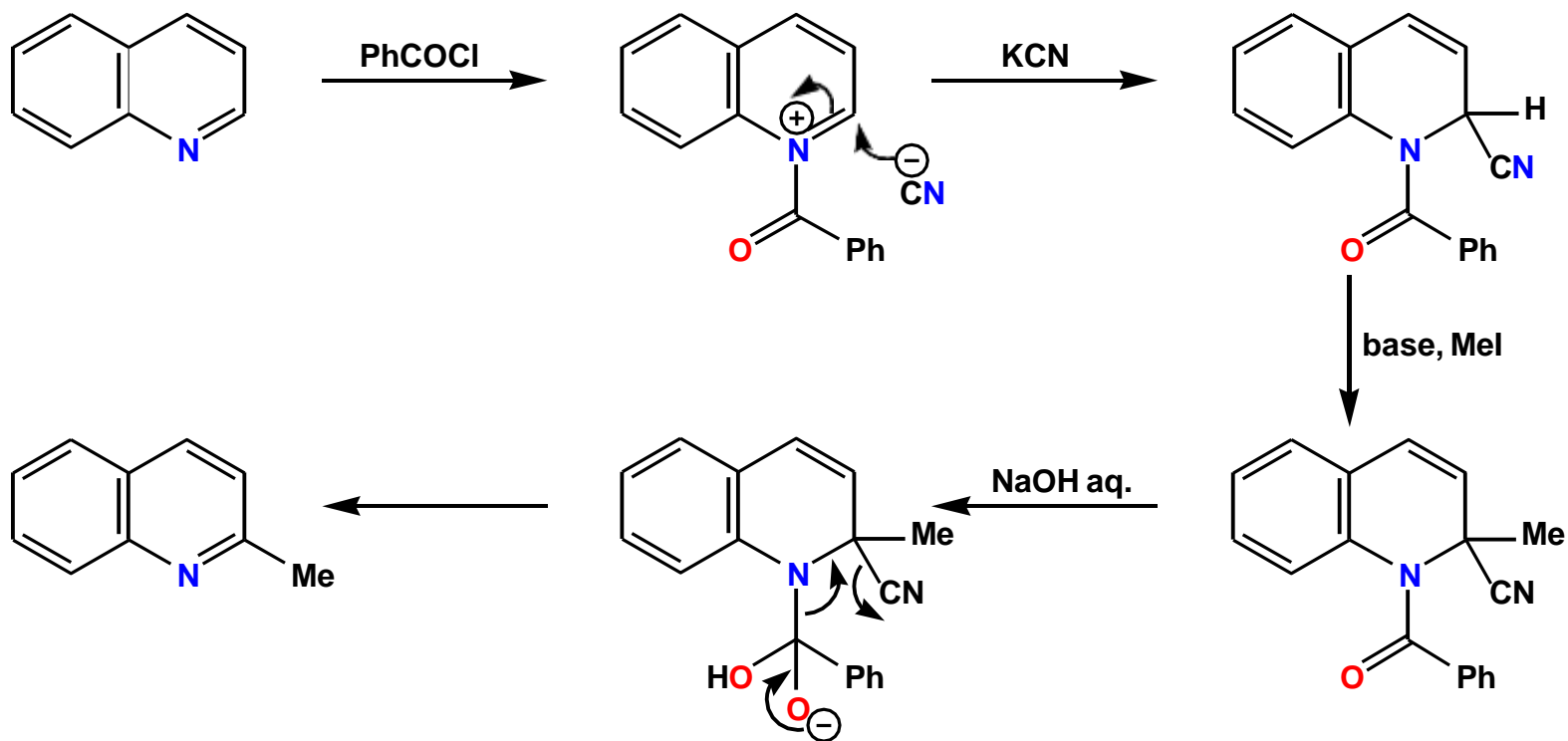


Quinolines/Isoquinolines – Nucleophilic Reactions

Displacement of Halogen



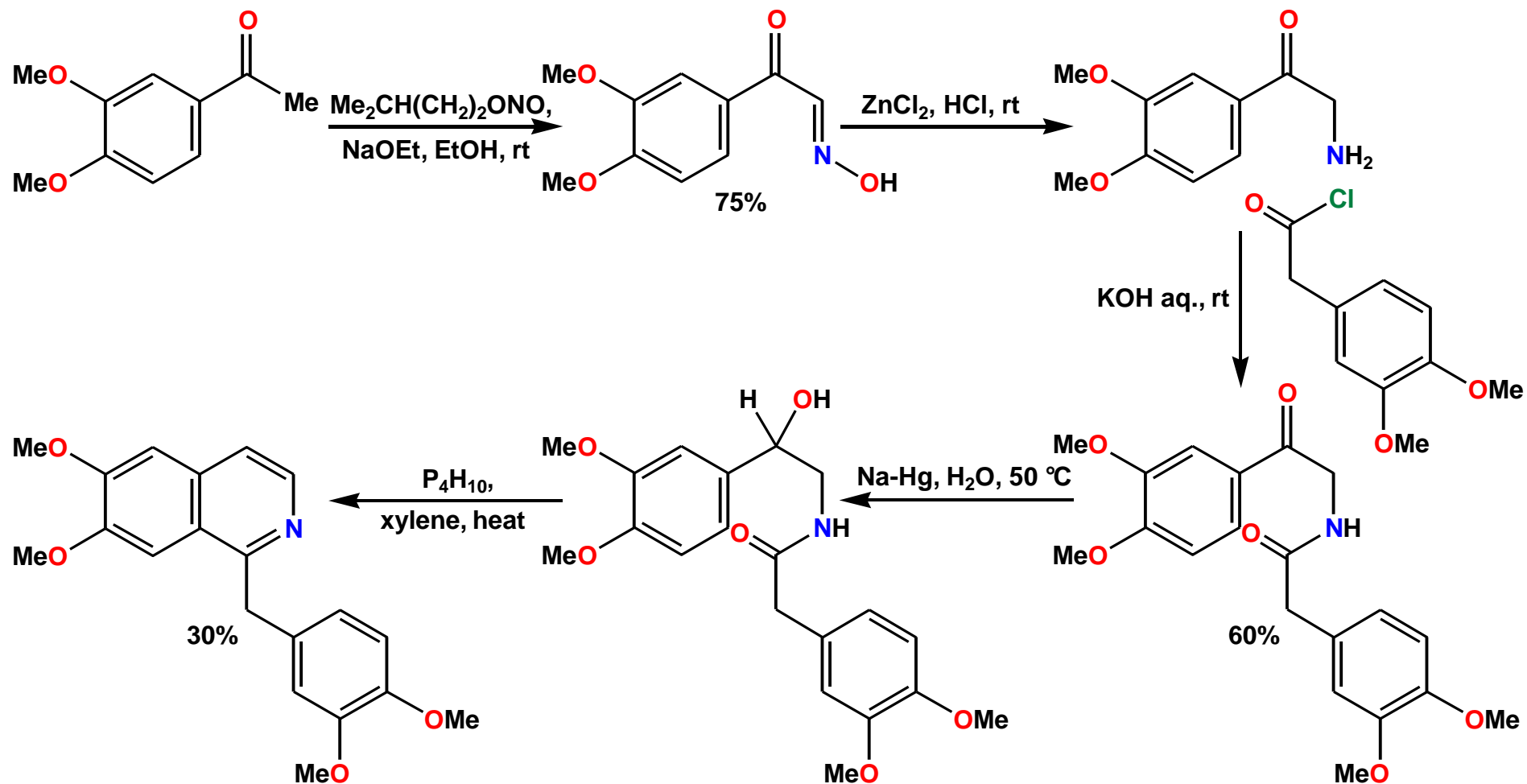
Quinolines/Isoquinolines – The Reissert Reaction



- The proton adjacent to the cyano group is extremely acidic
- The reaction works best with highly reactive alkyl halides

Isoquinolines – Synthesis of a Papaverine

Synthesis of Papaverine



•Cyclisation is achieved by the [Pictet-Grams reaction](#) cf. the [Bischler-Napieralski reaction](#)