Reactions of arenes (generic aromatic)

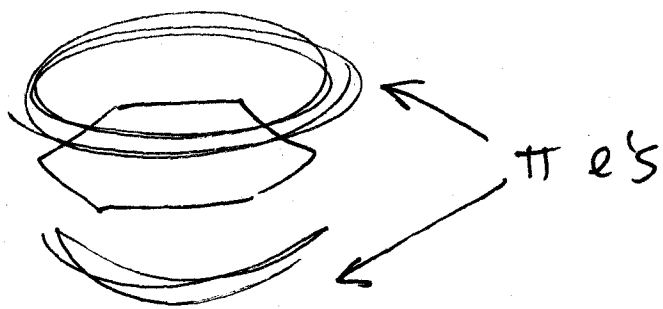
Rxns of the ring

* e'philic aromatic subst.
  nucleophilic arom. subst.
  reduction

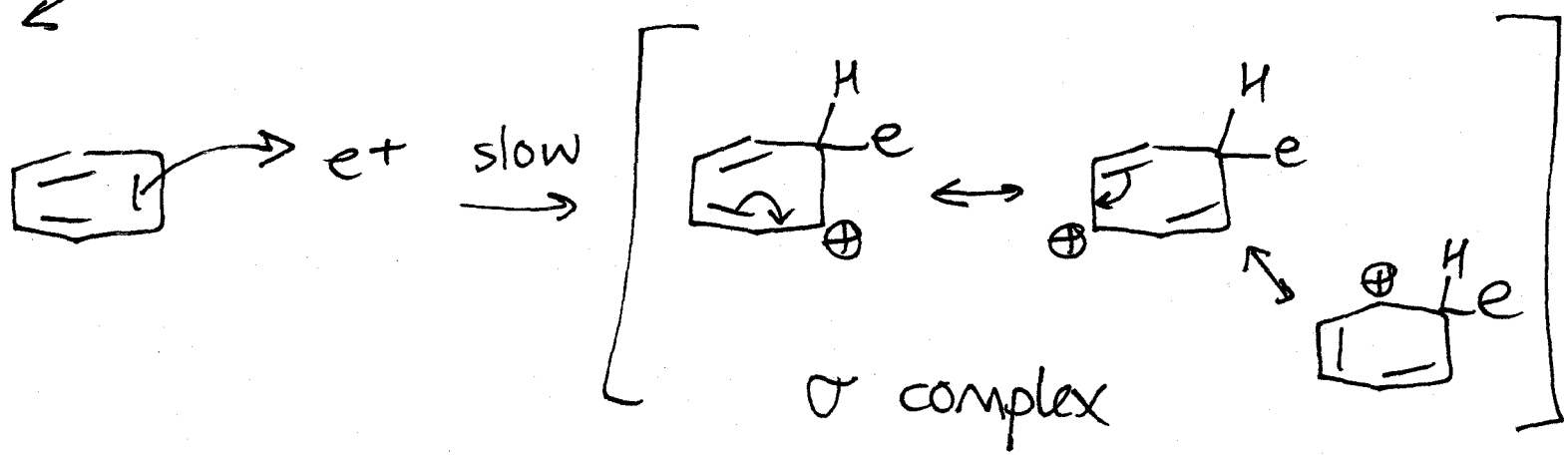
Rxns on the side chain

benzylic position
π bonds
oxidations
reductions

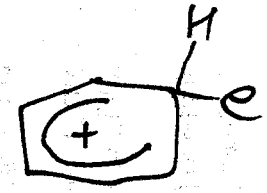
electrophilic Aromatic Substitution (EAS)

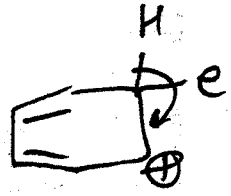


e^+ ← generic electrophile



Resonance hybrid:



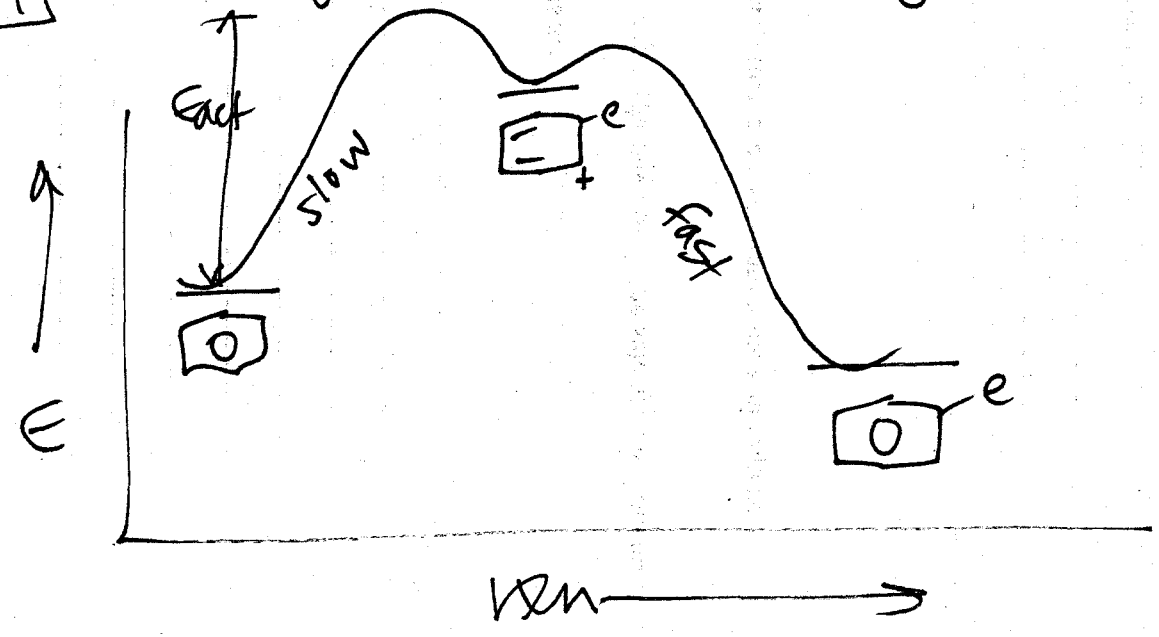


fast

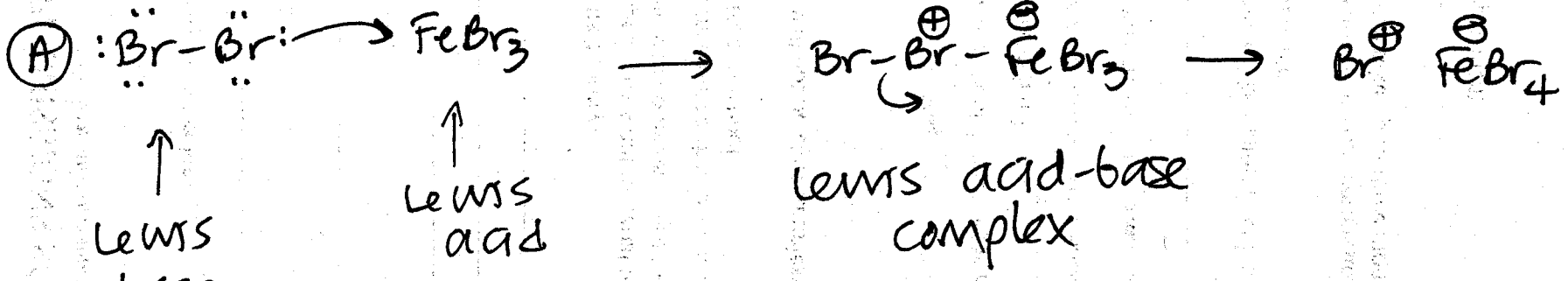
What happens next?

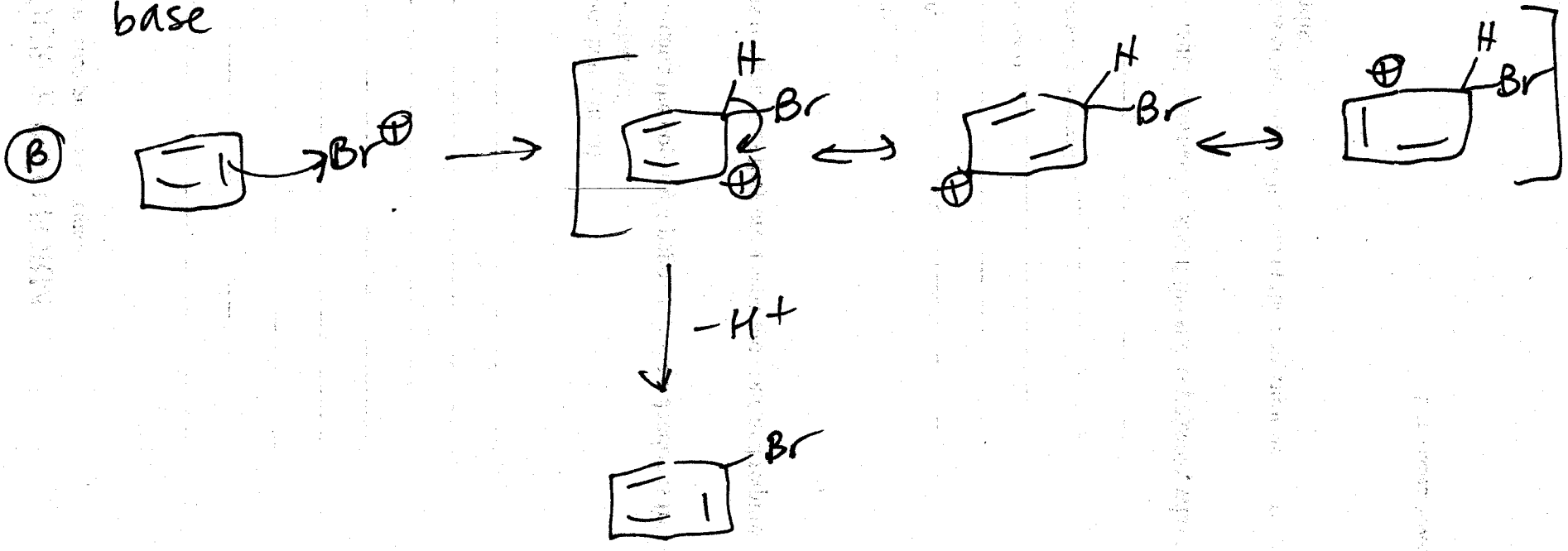
1. Rearrange? NO.
2. React w/ nucleophile? NO.
3. Lose an α H? YES

Regained aromaticity



1.a. Halogenation (Br_2, Cl_2)

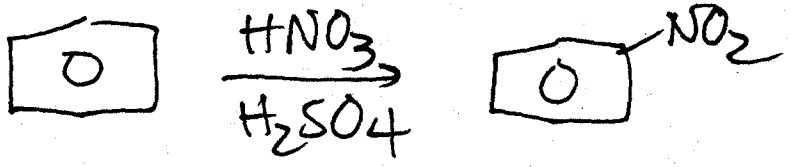




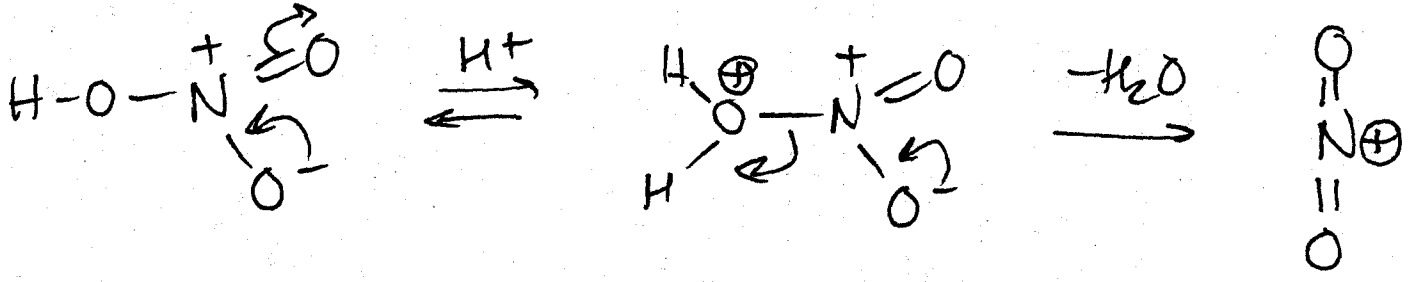
1b. Iodination

$I_2 \xrightarrow{HNO_3} 2\,I^+$ which then undergoes EAS as usual.

2. Nitration

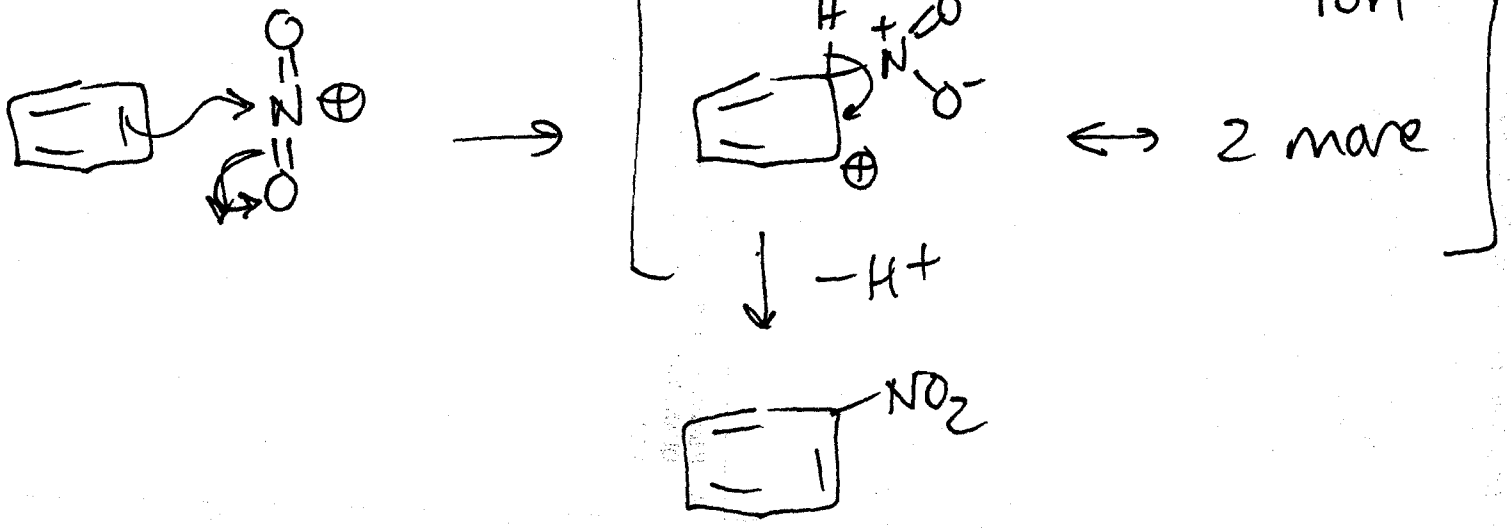


Ⓐ

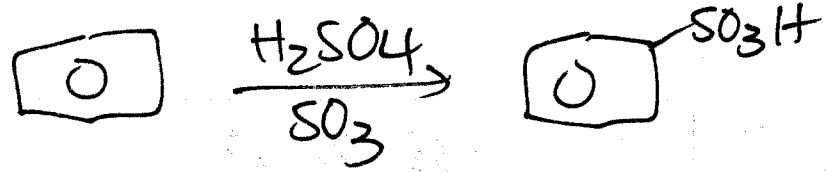


nitronium ion

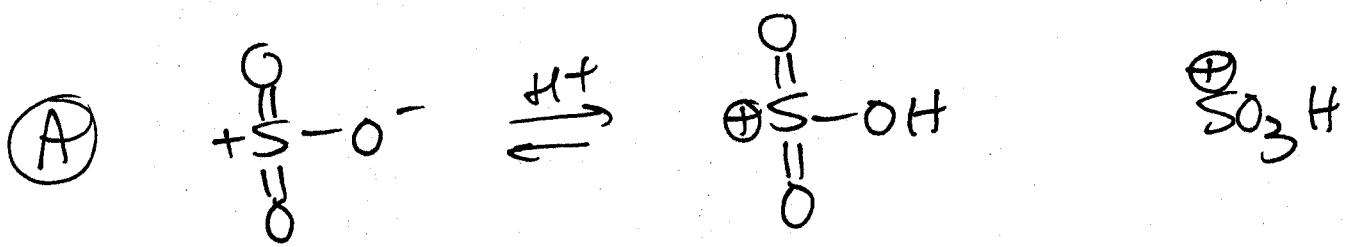
Ⓑ

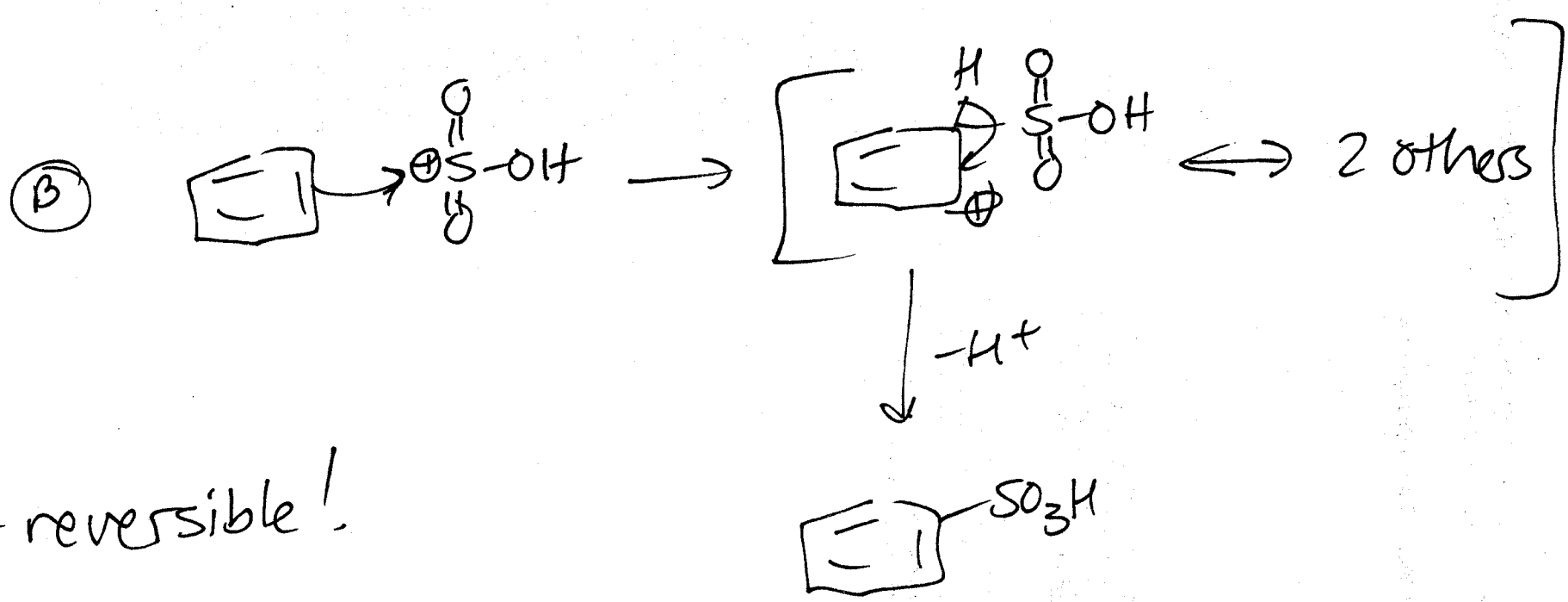


3. sulfonation



↑ fuming sulfuric acid





* reversible!