Organic Chemistry c3444y

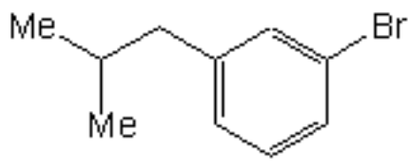
Problem Set 2 - Electrophilic Aromatic Substitution

Relevant book problems: 16.27, 16.28, 16.30, 16.31, 16.34-16.41, 16.43-16.46, 16.48b, 16.49a,b,c, 16.55, 16.65, 16.66. Also review the various mechanisms involved with electrophilic aromatic substitution, e.g. how is the nitronium ion formed?

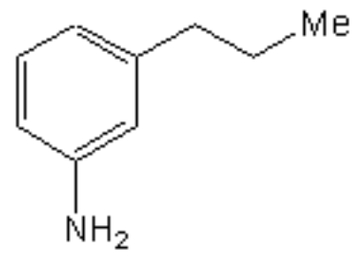
NOTE on the textbook reading: The material in 16.8, 16.9 and 16.10 will NOT be covered on the first exam.

1. Propose syntheses of the following compounds starting from benzene and any other reagents you might need.

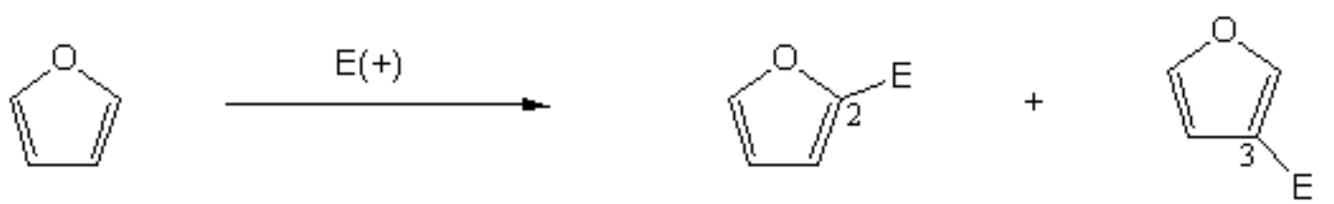
a.



b.



2. Electrophilic aromatic substitution is possible with aromatic systems other than benzene. For example, furan can undergo substitution to give the following products (E(+) = Electrophile):

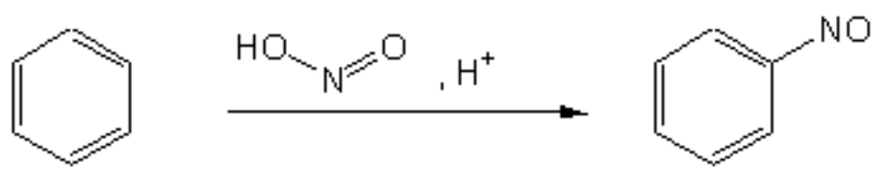


Major Product Minor Product

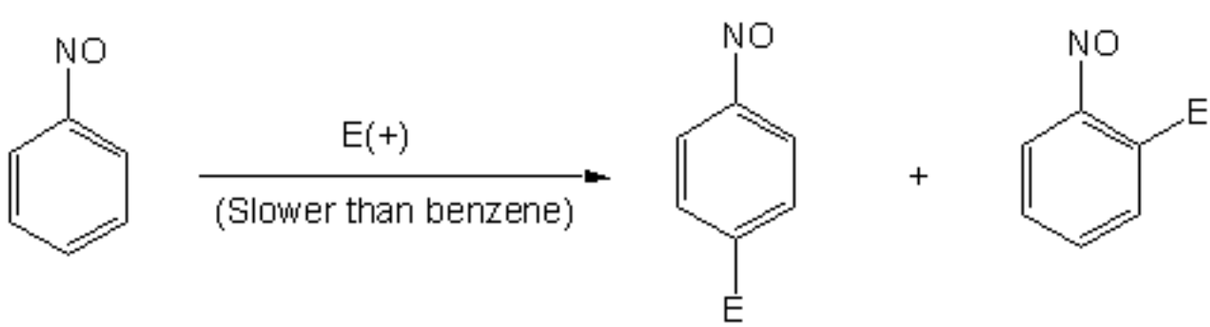
Given that the mechanism is exactly the same as for benzene, use resonance theory to explain the observed preference for substitution at the 2 position.

3. There is another type of electrophilic aromatic substitution called *nitrosation*. Provide a mechanism for this reaction. First, you must decide what is the actual electrophile here, and how it is formed.

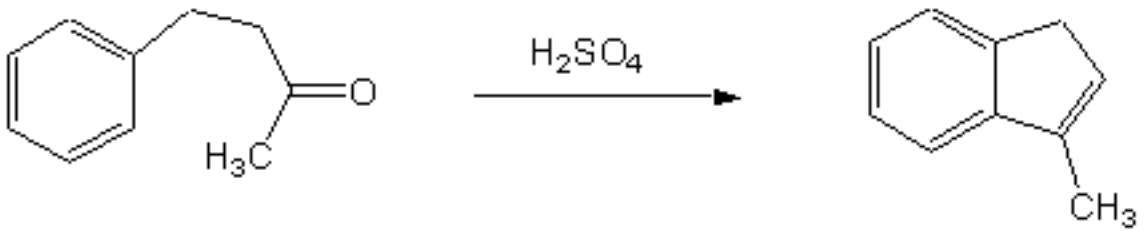
4.



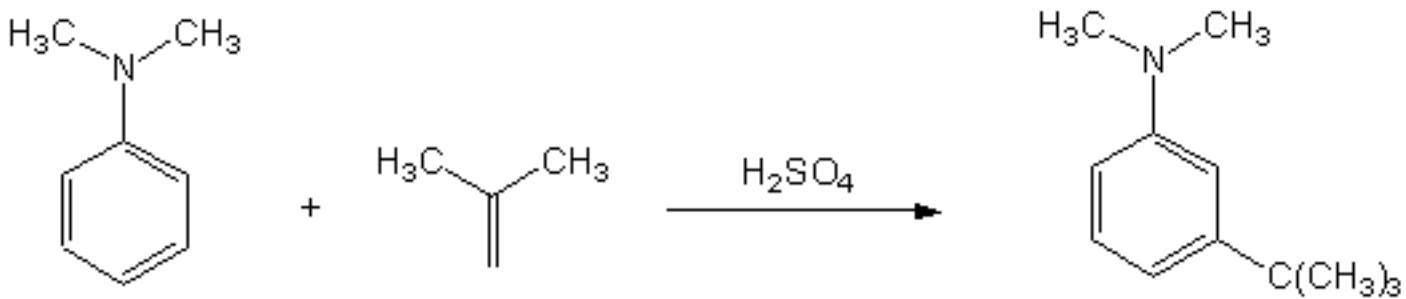
Provide an explanation for the fact that the nitroso group (NO) is a deactivator, but an *ortho/para* director.



4. Provide a mechanism for the following reaction. (The first part is an electrophilic aromatic substitution, and you need to decide what is E(+) and how it is formed.)



5. a. Draw a mechanism for the following alkylation reaction:



b. To the extent that this reaction goes at all, the *meta* product is the major product. *Why?!?*