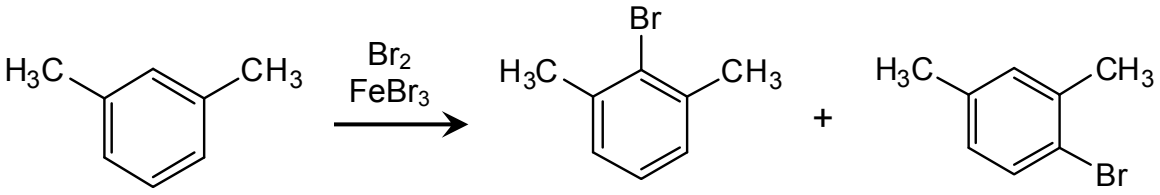
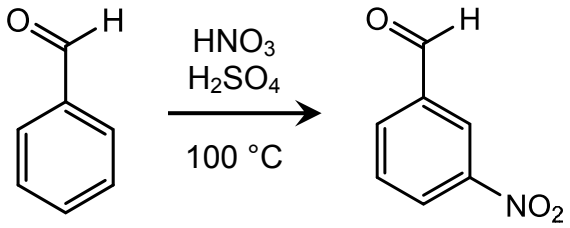
Chemistry 2302

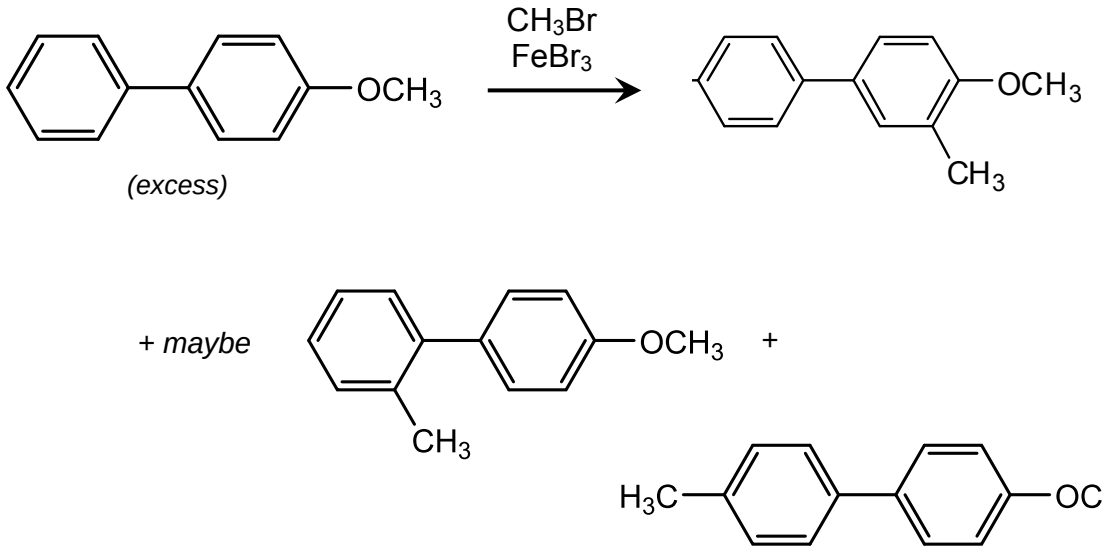
In-Class Exercise Solutions
Predicting Products From Electrophilic Aromatic Substitution



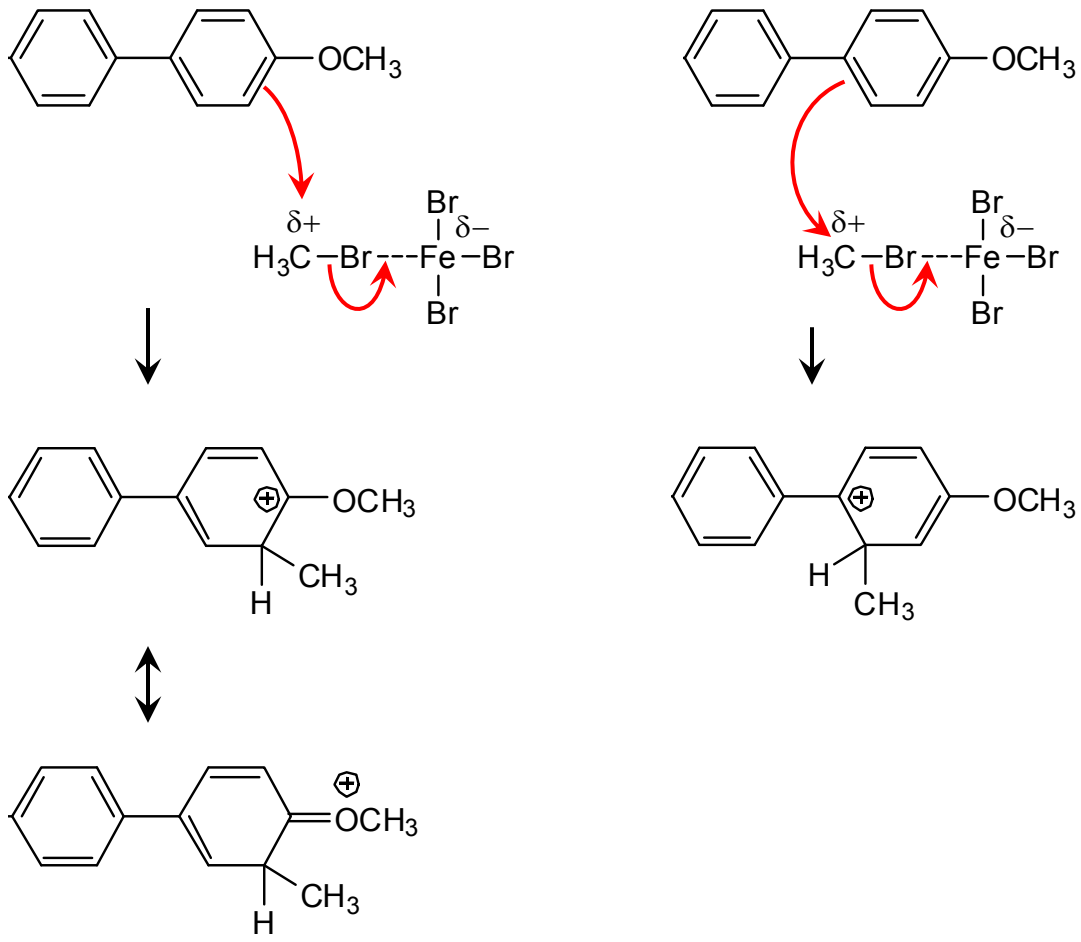
Both methyl groups are electron-donating and *ortho*-/*para*-directing. As it turns out, the *ortho* and *para* positions for the two groups are the same.



The aldehyde group is electron-withdrawing and *meta*-directing.



Okay, this one isn't so clear. Both –OCH_3 and –Ph are activating, *ortho*-/*para*-directing groups. But in this case, which one is more activating, more *ortho*-/*para*-directing? If we think about the cations that are formed for addition at each position,

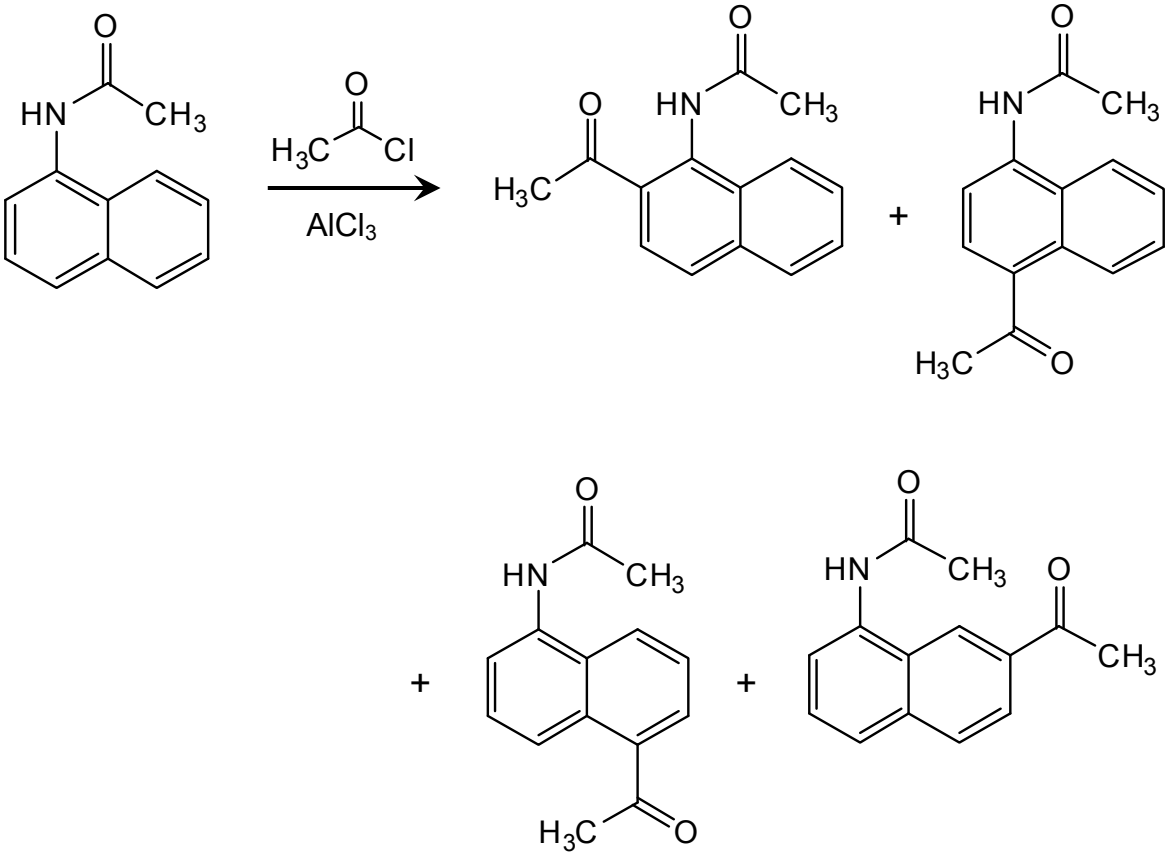


this one fills all octets and has more bonds,

this one doesn't.

I think that makes –OCH_3 a stronger directing group than –Ph, So I'd expect the methyl group to be *ortho*- to the –OCH_3.

There are also a couple other products that generate resonance structures like the one above that I've listed.



Addition at all of these positions generates cations that are stabilized by resonance with the nitrogen lone pair.