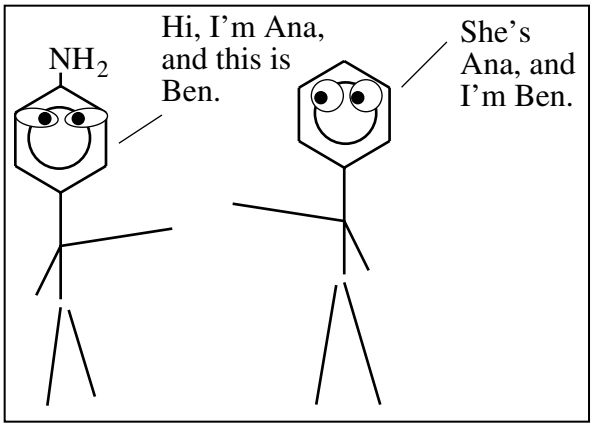
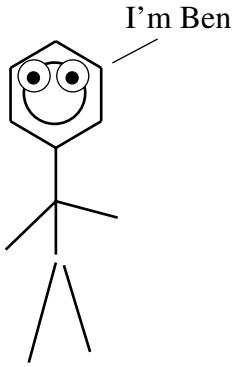
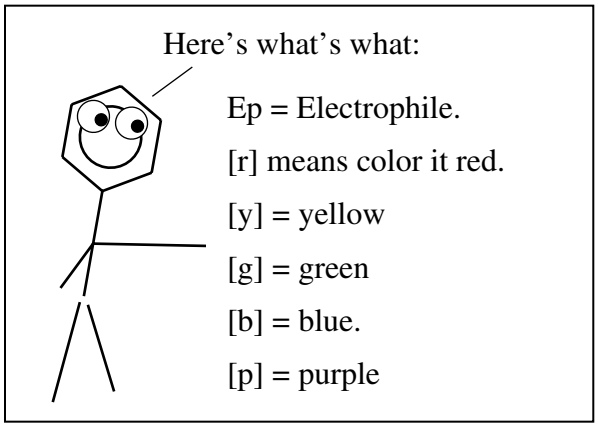
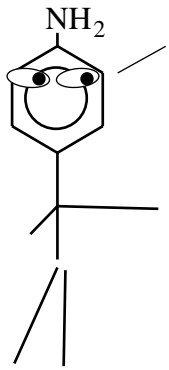
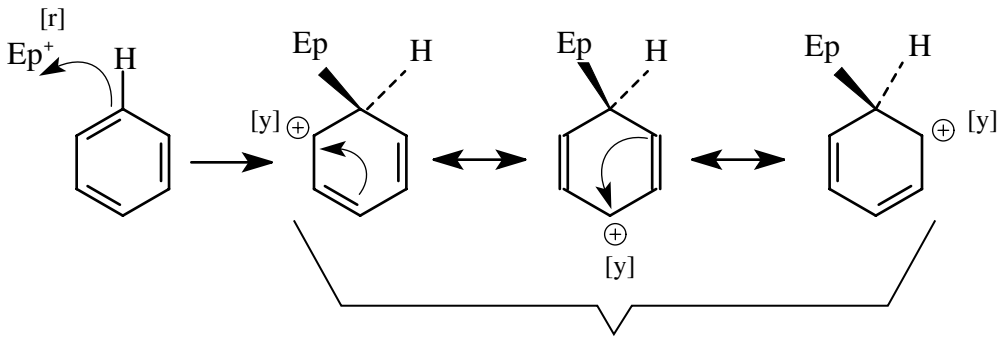




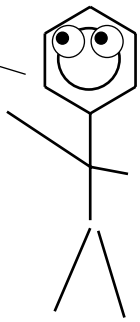


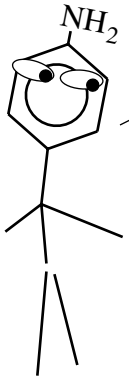


π-bonds in the ring are attracted to Ep's cause π bonds are negative, and Ep's are positive. Oh how I love a good resonance!

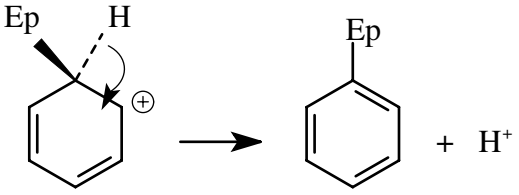


This is the **sigma complex intermediate!**

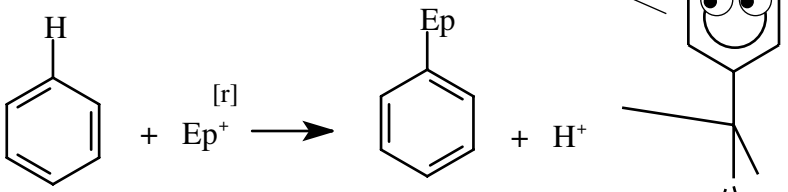


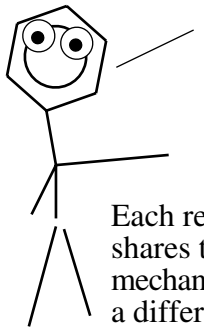


Then a proton is lost and a new benzene derivative is born. What a cute compound!



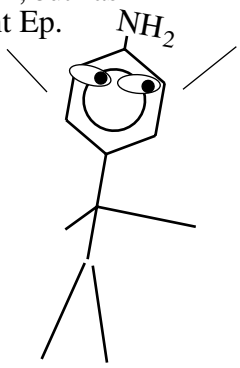
This is **Electrophilic Aromatic Substitution,** *EpArSub.*



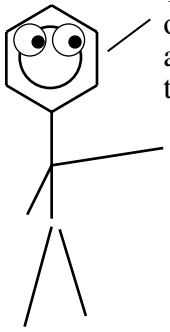


These are the major **Electrophilic Aromatic Substitution** reactions.

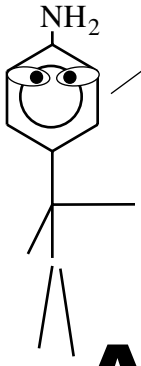
Each reaction shares the same mechanism, but has a different Ep.



The product of the first reaction is more reactive than benzene toward *EpArSub*.



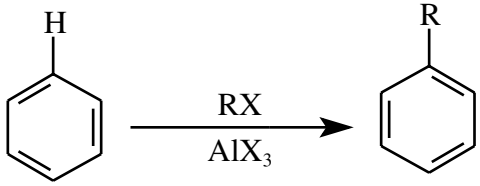
The products of the other four reactions are less reactive than benzene.



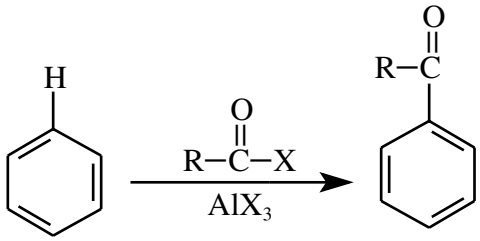
Groups like −R (alkyl) which increase reactivity are called **activators,** and those like −(C=O)−R, −X, $-NO_2$, and $-SO_3H$ are **deactivators.**

Check out page 541 for a list of activators and deactivators.

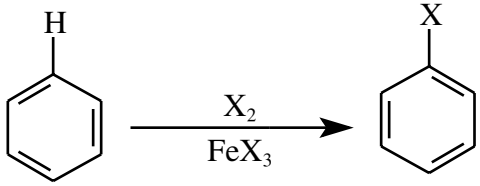
Freidel-Crafts Alkylation



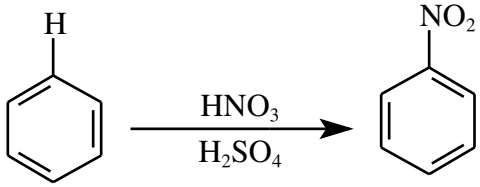
Freidel-Crafts Acylation



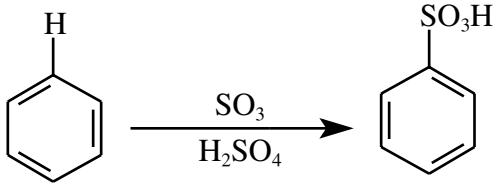
Halogenation



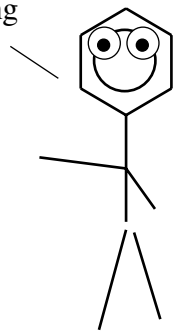
Nitration

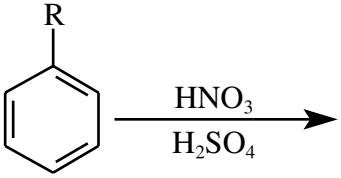


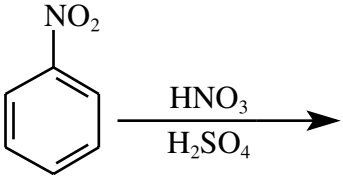
Sulfonation

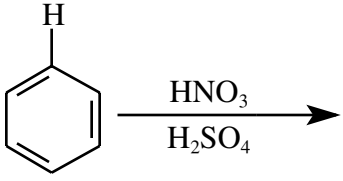


Can you list the following reactions in order of decreasing reactivity toward Nitration?



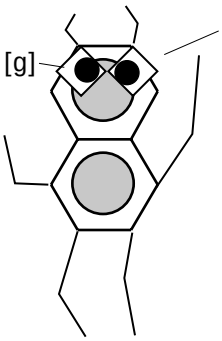
A 

B 

C 

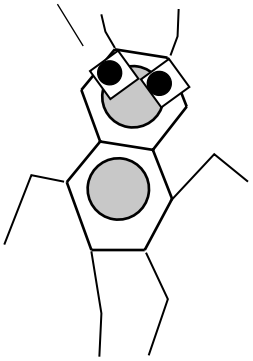
?>?>?

Answer on next page.



Yo chickenhead! Yo chickenhead! No stress now, the saltines had to jet. I'm The Napster--I'll hook you up.

Heads up mcfly, the correct answer is...

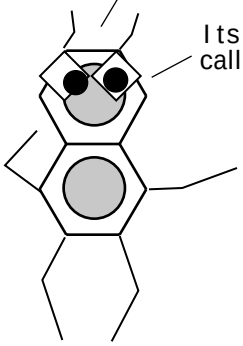


A>C>B

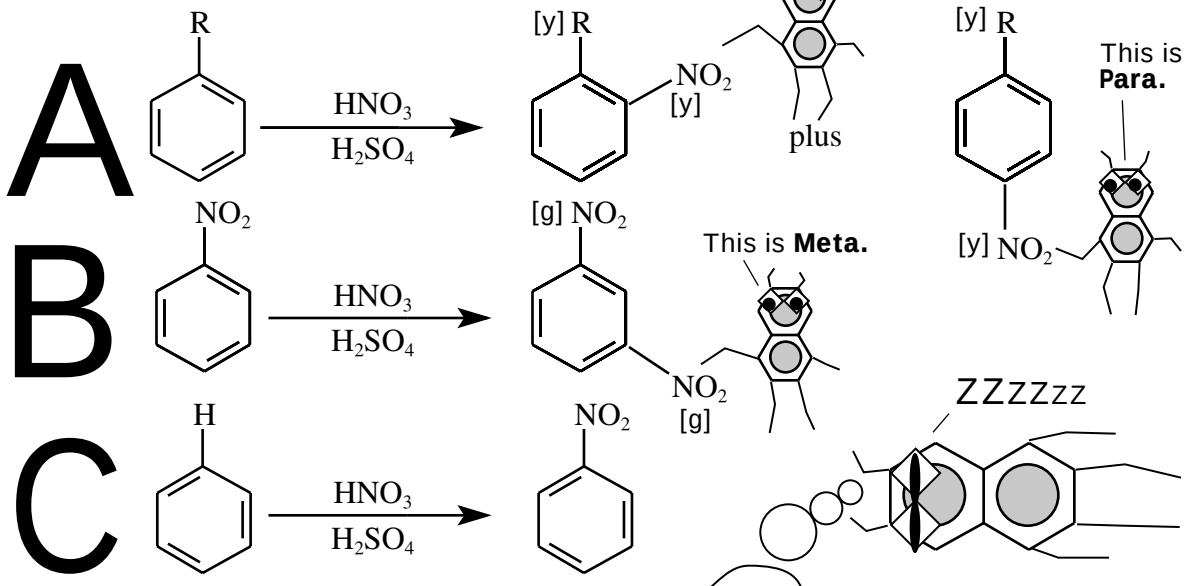
Activator [r] R > [p] H > [b] NO_2 Deactivator

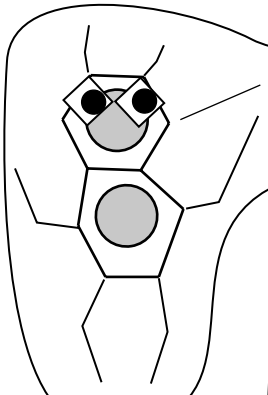
Benzene

Hey shorty, whad up?



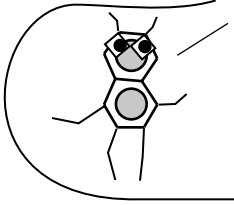
Its a miniature version of me. I think I'll call him Short Nap--and take one too.





The R (alkyl) group is an activator and an ortho/para director.

The NO_2 (nitro) group is a deactivator and a meta director.



Yo chickenhead! **Page 541,** check it out...

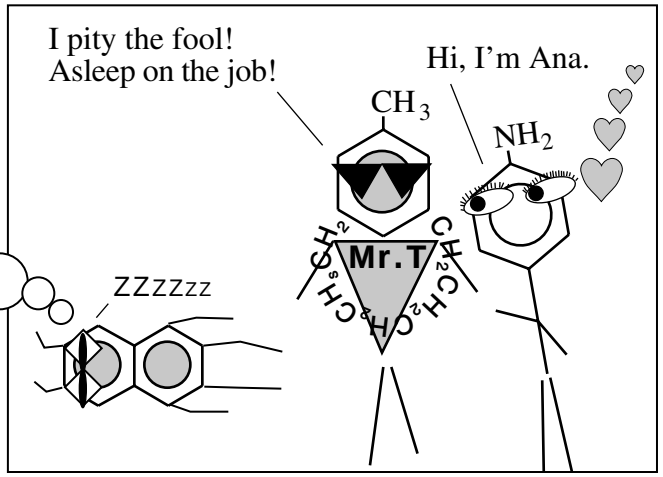
Get it straight mcfly, its the group on the ring, not the Ep that determines all da stuff below:

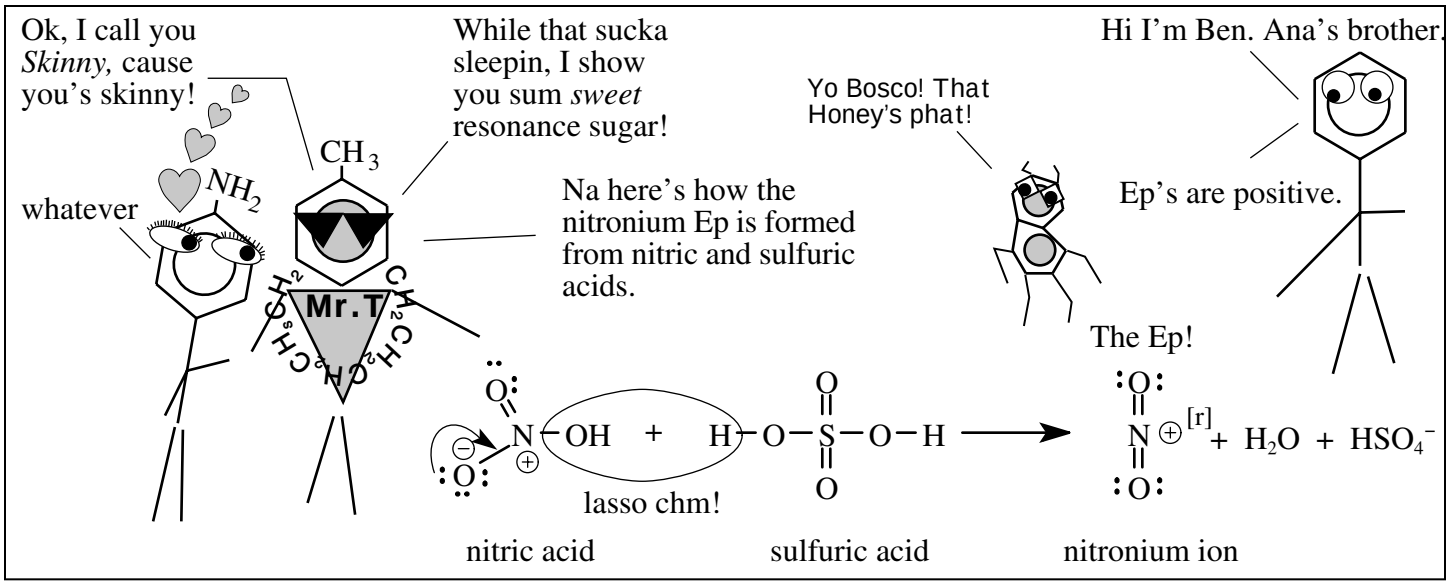
> All activators are ortho/para directors.

> All meta directors are deactivators

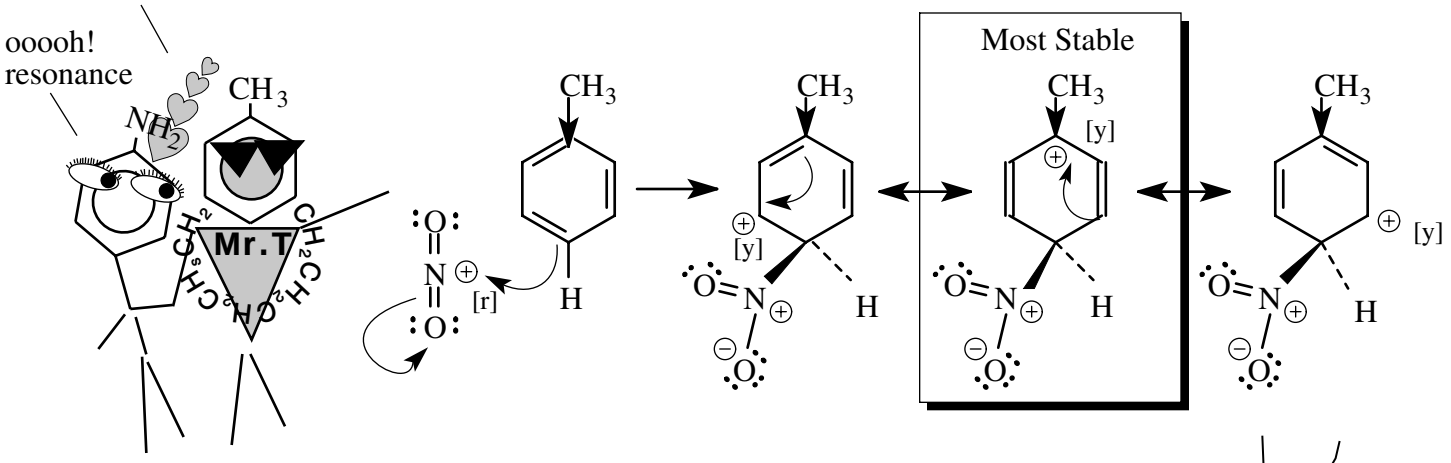
> Only the halogens are ortho/para - deactivators.

Meanwhile...





Shut up fool!! You ain't no bro of mine!
Na here sum resonance for my baby.

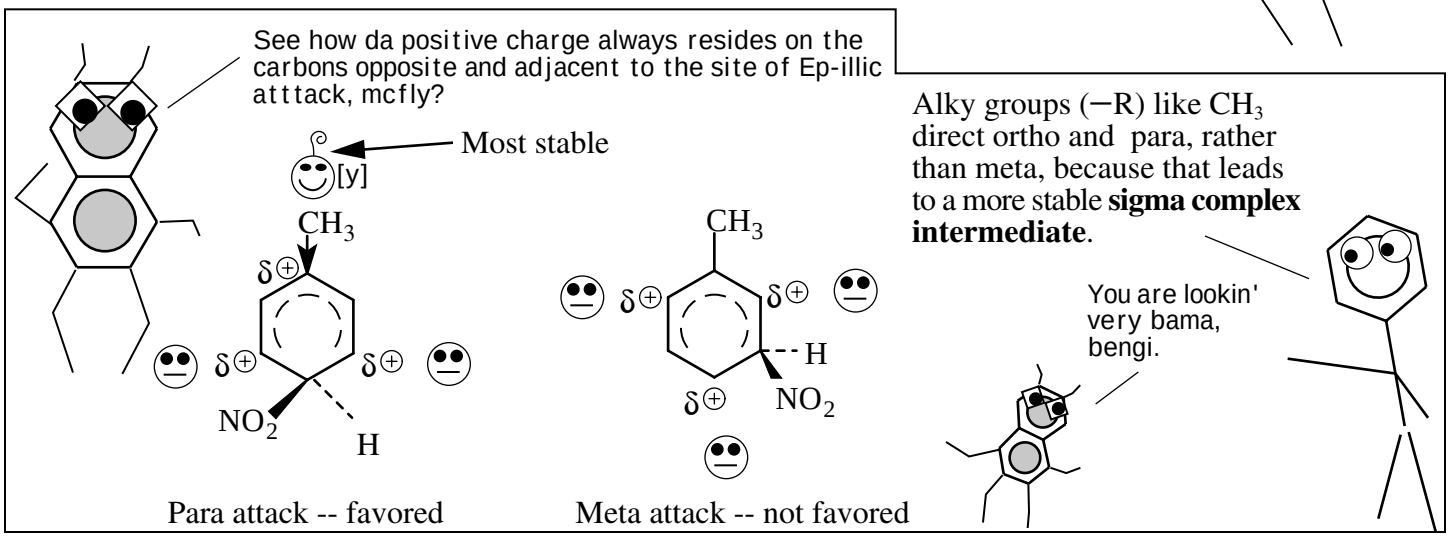


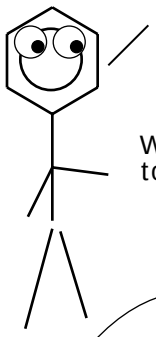
Yo chickenhead! The Napster's back; time to get this cartoon kickin'!

Na the reason why the most stable is the most stable is due to induction. That's electronegativity vectors acting on them sigma single bonds causing a diminution of the positive charge on the carbon bearing the methyl moiety.

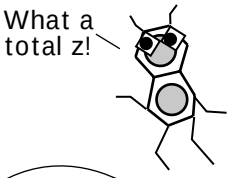
Hello!? Hello!?

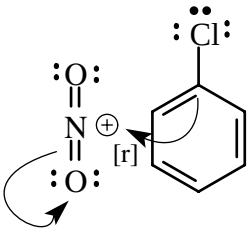
Chill dipstick, just memorize whaz in da box.

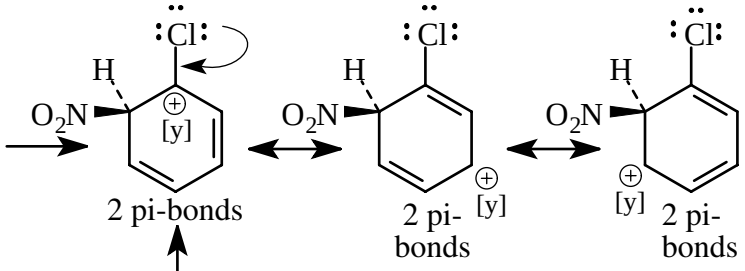




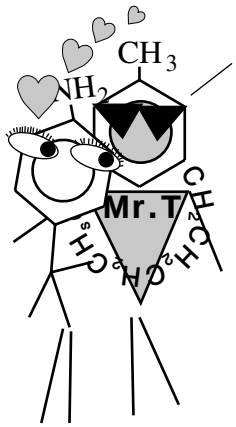
All groups that have a lone pair on the atom connected to the benzene ring are ortho para directors. Examples include $-NH_2$, $-OH$, $-OCH$, $-NHCOCH_3$, and $-X$. As Bill Nye would say" Way cool science!".



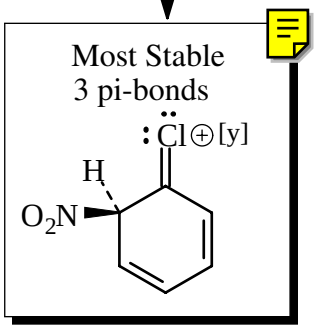




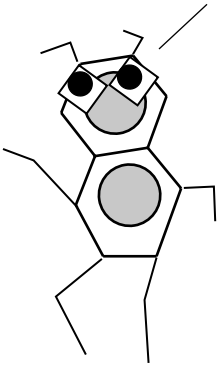
Oooooh more resonance! I so love ortho attack by the nitronium ion on chlorobenzene.



In this case **the resonance form with the most pi-bonds is the most stable.** That's 4 resonance forms for my sugar pi.



Word up mcfly! You get one extra chillin resonance form with ortho/para attack, when a pair be found on the atom bonded to the ring.



To be continued...