ORGANIC CHEMISTRY 2 LECTURE GUIDE 2019

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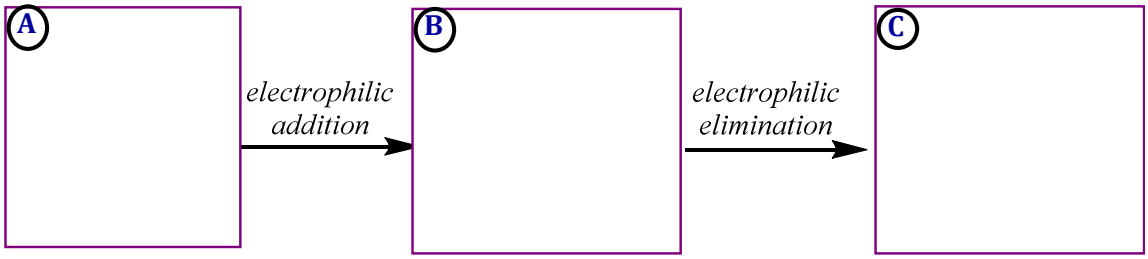
Lesson IV.9. EAS III: Halogenation of Benzene

Iodination

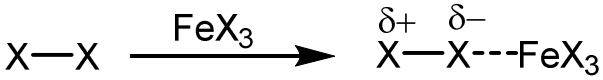
Iodenium (I^+) electrophiles can be generated by oxidation of iodine by nitric acid:

$$I_2 + HNO_3 + 2H^+ \longrightarrow 2I^+ + HNO_2 + H_2O$$

Once generated, the iodenium ion undergoes the usual EAS process with benzene. This is called an **iodination reaction**:



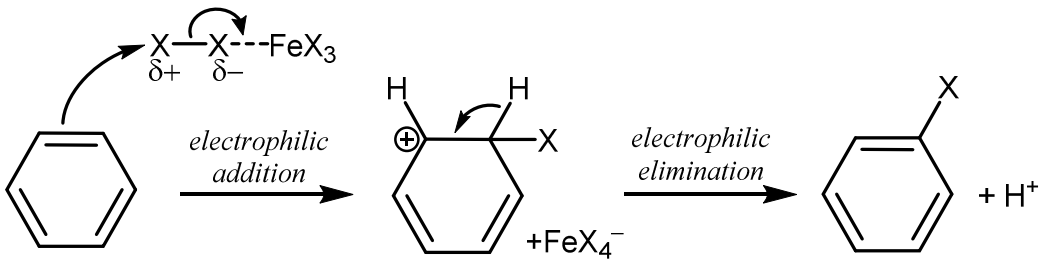
Chlorine and bromine are more electronegative than iodine, so it is more difficult to form bromenium or chlorenium for use in EAS reactions. However, bromine and chlorine can be **polarized** by interaction with iron salts:



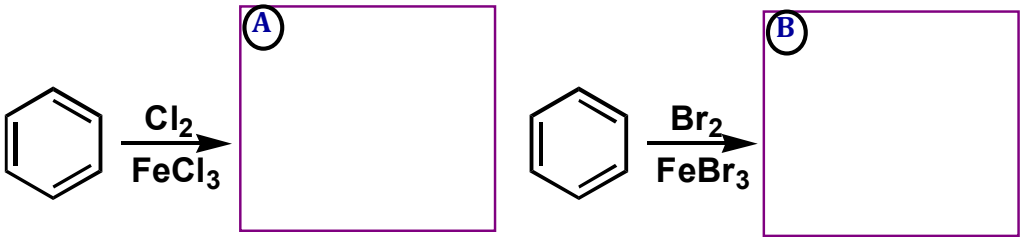
Notes

Lesson IV.9. EAS III: Halogenation of Benzene
Chlorination and Bromination

The polarized halogens can then be used as electrophiles for EAS with benzene. When X = Cl, this is called a **chlorination reaction**; when X = Br, this is called a **bromination reaction**. Note also that the FeX_3 salt can be generated *in situ* by action of X_2 on Fe metal.



The net reactions are:



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