

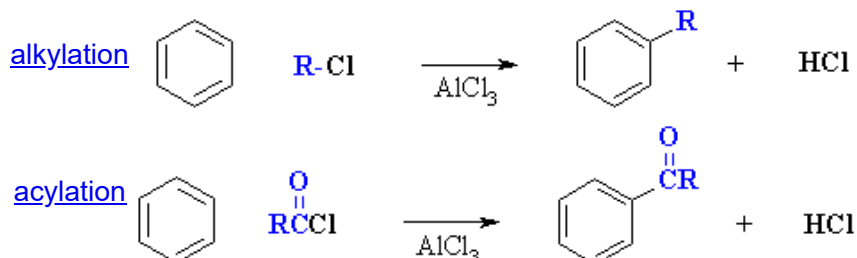


Chapter 12 : Reactions of Arenes. Electrophilic Aromatic Substitution



Review of Limitations of Friedel-Crafts reactions

As we have seen previously there are two types of Friedel-Crafts reactions, [alkylation](#) and [acylation](#):



Reaction type: Electrophilic Aromatic Substitutions

However there are certain limitations:

Summary of Limitations of Friedel-Crafts alkylations:

- The halide **must be either** an alkyl halide. Vinyl or aryl halides **do not react** (their intermediate carbocations are too unstable).
- Alkylation reactions are prone to [carbocation rearrangements](#).
- Deactivated benzenes are not reactive to Friedel-Crafts conditions, the benzene needs to be as or more reactive than a mono-halobenzene (see [substituent effects](#))
- Over alkylation can be a problem since the product is more reactive than the starting material. This can usually be controlled with an excess of the benzene.
- The Lewis acid catalyst AlCl_3 often complexes to aryl amines making them very unreactive.

Summary of Limitations of Friedel-Crafts acylations:

- Acylation can only be used to give **ketones**. This is because HCOCl decomposes to CO and HCl under the reaction conditions.
- Deactivated benzenes are not reactive to Friedel-Crafts conditions, the benzene needs to be as or more reactive than a mono-halobenzene (see [substituent effects](#))
- The Lewis acid catalyst AlCl_3 often complexes to aryl amines making them very unreactive.
- Amines and alcohols can give competing N or O acylations rather than the require ring acylation.

QUESTION : Why aren't acylation reactions as prone to over acylation ? [ANSWER](#)



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