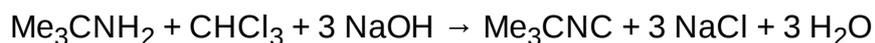


Carbylamine reaction

The **carbylamine reaction** (also known as the Hoffmann isocyanide synthesis) is the synthesis of an isocyanide by the reaction of a primary amine, chloroform, and base. The conversion involves the intermediacy of dichlorocarbene.

Illustrative is the synthesis of *tert*-butyl isocyanide from *tert*-butylamine in the presence of catalytic amount of the phase transfer catalyst benzyltriethylammonium chloride.^[1]



Similar reactions have been reported for aniline. It is used to prepare secondary amines.

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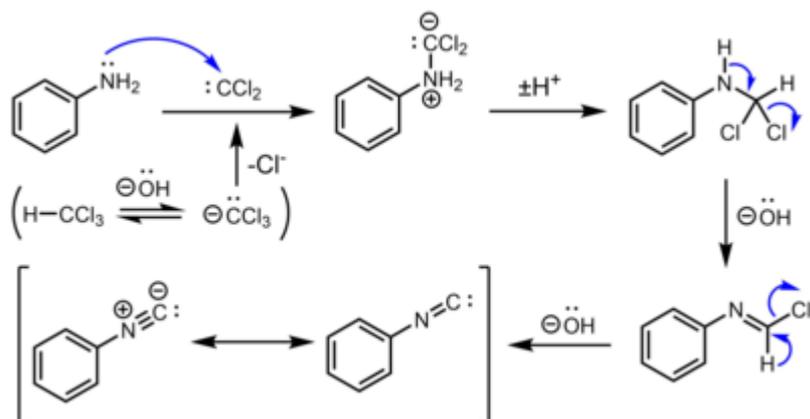
References

Test for primary amines

As it is only effective for primary amines, the carbylamine reaction can be used as a chemical test for their presence. In this context, the reaction is also known as **Saytzeff's isocyanide test**.^[2] In this reaction, the analyte is heated with alcoholic potassium hydroxide and chloroform. If a primary amine is present, the isocyanide (carbylamine) is formed, as indicated by a foul odour. The carbylamine test does not give a positive reaction with secondary and tertiary amines.

Mechanism

The mechanism involves the addition of amine to dichlorocarbene, a reactive intermediate generated by the dehydrohalogenation of chloroform. Two successive base-mediated dehydrochlorination steps result in formation of the isocyanide.



See also

- [Isodiazomethane](#)
- [Carbene](#)

References

1. G. W. Gokel; R. P. Widera; W. P. Weber (1988). "Phase-transfer Hofmann Carbylamine Reaction: tert-Butyl Isocyanide". *55*: 232. doi:[10.15227/orgsyn.055.0096](https://doi.org/10.15227%2Forgsyn.055.0096) (<https://doi.org/10.15227%2Forgsyn.055.0096>).
 2. Carbylamine reaction (http://www.books-about-california.com/Pages/Experimental_Organic_Chemistry/Ex_Organic_Chem_Chap_09.html)
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