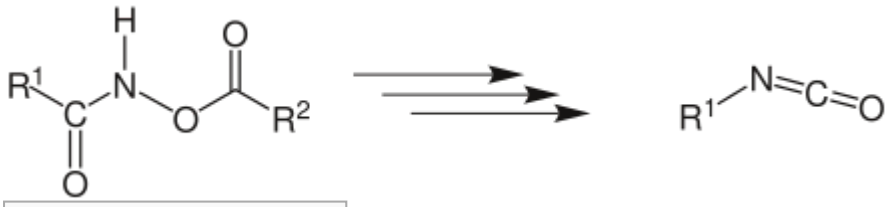
Lossen rearrangement

The **Lossen rearrangement** is the conversion of a hydroxamate ester to an isocyanate. Typically O-acyl, sulfonyl, or phosphoryl O-derivative are employed.[1][2][3][4] The isocyanate can be used further to generate ureas in the presence of amines or generate amines in the presence of H_2O.

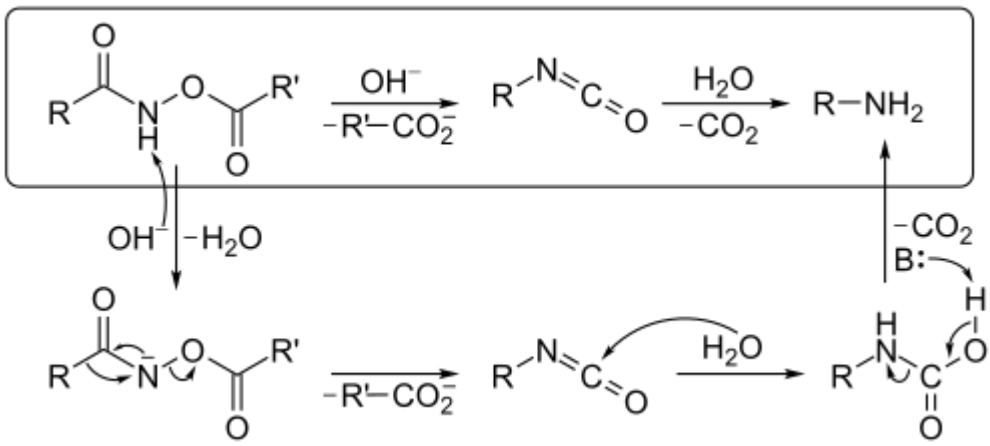


Lossen rearrangement	
Named after	Wilhelm Lossen
Reaction type	Rearrangement reaction
Identifiers	
RSC ontology ID	RXNO:0000156

Contents

Reaction mechanism

The mechanism below begins with an O-acylated hydroxamic acid derivative that is treated with base to form an isocyanate that generates an amine and CO_2 gas in the presence of H_2O. The hydroxamic acid derivative is first converted to its conjugate base by abstraction of a hydrogen by a base. Spontaneous rearrangement releases a carboxylate anion to produce the isocyanate intermediate. The isocyanate is then hydrolyzed in the presence of H_2O. Finally, the respective amine and CO_2 are generated by abstraction of a proton with a base and decarboxylation.



Hydroxamic acids are commonly synthesized from their corresponding esters.[5]

Historical references

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- Lossen, W. (1875). "Ueber die Structurformel des Hydroxylamins und seiner amidartigen Derivate" (https://zenodo.org/record/1427343/files/article.pdf) (PDF). *Justus Liebigs Annalen der Chemie*. **175** (3): 271–304. doi:10.1002/jlac.18751750303 (https://doi.org/10.1002%2Fjlac.18751750303).
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See also

- Curtius rearrangement
- Hofmann rearrangement
- Schmidt reaction
- Gabapentin

References

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2. Yale, H. L. (1943). "The Hydroxamic Acids". *Chem. Rev.* **33** (3): 209–256. doi:10.1021/cr60106a002 (https://doi.org/10.1021%2Fcr60106a002).
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5. Hauser, C. R.; Renfrow, Jr.., W. B. (1939). "Benzohydroxamic Acid". *Organic Syntheses*. **19**: 15. doi:10.15227/orgsyn.019.0015 (https://doi.org/10.15227%2Forgsyn.019.0015).

External links

- "Mechanism in Motion: Lossen rearrangement" (https://www.youtube.com/watch?v=0-hbqMzgxw0).