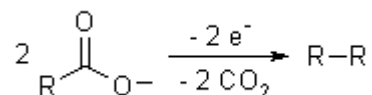
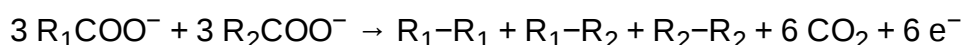


# Kolbe electrolysis

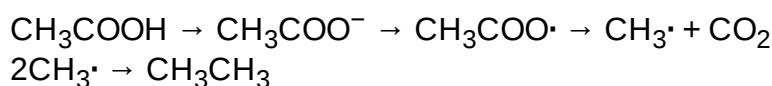
The **Kolbe electrolysis** or **Kolbe reaction** is an organic reaction named after Hermann Kolbe.<sup>[1]</sup> The Kolbe reaction is formally a decarboxylative dimerisation of two carboxylic acids (or carboxylate ions). The overall reaction is:



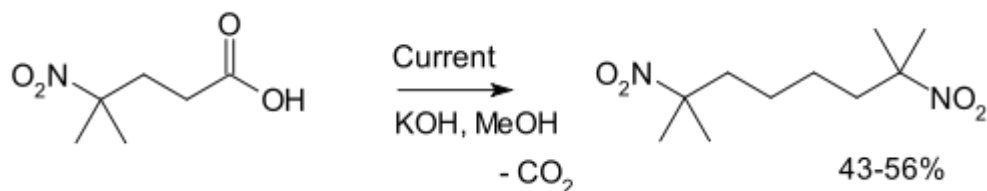
If a mixture of two different carboxylates are used, all combinations of them are generally seen as the organic product structures:



The reaction mechanism involves a two-stage radical process: electrochemical decarboxylation gives a radical intermediate, which combine to form a covalent bond.<sup>[2]</sup> As an example, electrolysis of acetic acid yields ethane and carbon dioxide:



Another example is the synthesis of 2,7-dimethyl-2,7-dinitrooctane from 4-methyl-4-nitrovaleric acid:<sup>[3]</sup>



## Contents

### Further reading

### See also

### References

### External links

## Further reading

- Kolbe, Hermann (1848). "Zersetzung der Valeriansäure durch den elektrischen Strom" (<https://babel.hathitrust.org/cgi/pt?id=uiug.30112025847739;view=1up;seq=353>) [Decomposition of valeric acid by an electric current]. *Annalen der Chemie und Pharmacie*. **64** (3): 339–341. doi:10.1002/jlac.18480640346 (<https://doi.org/10.1002%2Fjac.18480640346>).
- Kolbe, Hermann (1849). "Untersuchungen über die Elektrolyse organischer Verbindungen" (<https://babel.hathitrust.org/cgi/pt?id=hvd.hx3bh3;view=1up;seq=271>) [Investigations of the

electrolysis of organic compounds]. *Annalen der Chemie und Pharmacie*. **69** (3): 257–294. doi:10.1002/jlac.18490690302 (<https://doi.org/10.1002%2Fjac.18490690302>).

## See also

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- [Electrosynthesis](#)
- [Wurtz reaction](#)

## References

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1. Utley, James (1997). "Trends in Organic Electrosynthesis". *Chemical Society Reviews*. **26** (3): 157. doi:10.1039/cs9972600157 (<https://doi.org/10.1039%2Fcs9972600157>).
2. Vijh, A. K.; Conway, B. E. (1967). "Electrode Kinetic Aspects of the Kolbe Reaction". *Chem Rev*. **67** (6): 623–664. doi:10.1021/cr60250a003 (<https://doi.org/10.1021%2Fcr60250a003>).
3. Sharkey, W. H.; Langkammerer, C. M. (1973). "2,7-Dimethyl-2,7-dinitrooctane" (<http://www.orgsyn.org/demo.aspx?prep=cv5p0445>). *Organic Syntheses*; *Collective Volume*, **5**, p. 445

## External links

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- "["Kolbe Electrolysis"](https://www.organic-chemistry.org/namedreactions/kolbe-electrolysis.shtml) (<https://www.organic-chemistry.org/namedreactions/kolbe-electrolysis.shtml>). Organic Chemistry Portal. Retrieved 22 October 2007.

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