The reaction of aldehydes and ketones with zinc amalgam (Zn/Hg alloy) in concentrated hydrochloric acid, which reduces the aldehyde or ketone to a hydrocarbon, is called Clemmensen reduction.

Introduction

This alternative reduction involves heating a carbonyl compound with finely divided, amalgamated zinc in a hydroxylic solvent (often an aqueous mixture) containing a mineral acid such as HCl. The mercury alloyed with the zinc does not participate in the reaction, it serves only to provide a clean active metal surface.

Example

Possible mechanism

The mechanism of Clemmensen reduction is not fully understood; intermediacy of radicals are implicated. Clemmensen reduction is complementary to Wolff-Kishner reduction, which also converts aldehydes and ketones to hydrocarbons, in that the former is carried out in strongly acidic conditions and the latter in strongly basic conditions.

References

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