

FACILE ADDITION OF ALUMINIUM HYDRIDE  
TO TRANS CYCLO-OCTENE

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We have reported (1,2) the conversion of enamines into olefines by reaction with a 'mixed hydride' reagent ( $AlH_2Cl$ ) and with diborane. Further work (3) has established that aluminium hydride is more effective than the chlorohydride in this reaction.

When 1-pyrrolidinocyclo-octene was reacted with excess aluminium hydride (prepared in ether from aluminium chloride and lithium aluminium hydride), cyclo-octane (85%) was formed instead of the expected cyclo-octene. When the aluminium hydride:enamine ratio was reduced to 0.5 the major product was still cyclo-octane and no cyclo-octene could be detected.

These results are in contrast to the reported (1) formation of (cis) cyclo-octene (20%) from the reaction of the enamine with  $AlH_2Cl$ . We have repeated this reaction and found that the only hydrocarbon product is cyclo-octane (7%). With  $AlHCl_2$  on the other hand, the enamine gave cis-cyclo-octene (6%) together with N-cyclo-octylpyrrolidine (84%).

It is reasonable to assume that cyclo-octene is an intermediate in the aluminium hydride reaction, and undergoes unusually facile\*\* reaction with

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\*\* Olefines react with ether only in closed systems in the absence of ether (4).

the reagent to give an adduct which is hydrolysed to cyclo-octane. Cis-cyclo-octene was recovered unchanged from prolonged treatment with aluminium hydride in ether but trans-cyclo-octene reacted rapidly to give, after work-up, cyclo-octane. The trans-isomer behaved similarly with  $AlH_2Cl$  but was isomerised to the cis-isomer by  $AlHCl_2$ . The facile addition to the trans-isomer is in keeping with the high degree of strain in the molecule.

Trans-cyclo-octene must, therefore, be the primary product in the reaction of  $AlH_3$  and  $AlH_2Cl$  with the enamine. The significance of this result to the overall stereochemistry of the hydrogenolysis reaction will be discussed in a fuller publication.

#### REFERENCES

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