

Asymmetric Hydrogenation at a Rhodium Complex using (+)- or (–)-PhCHMe·NHCHO or (–)-MeCH(OH)·CONMe₂ as Ligands

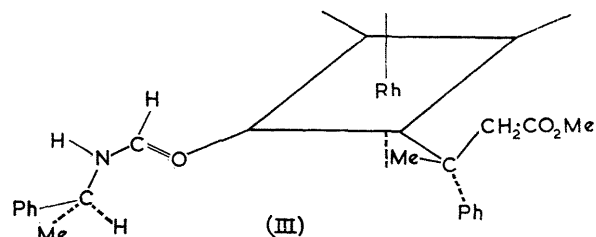
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Summary Methyl 3-phenylbut-2-en-oate is homogeneously hydrogenated at a rhodium complex formed in (+)- or (–)-1-phenylethylformamide to give (+)- or (–)-methyl 3-phenylbutanoate in better than 50% optical yield.

FOLLOWING our observation¹ of homogeneous hydrogenation by a rhodium complex formed in dimethylformamide solution and bearing dmf as a ligand, we examined the possibility of asymmetric hydrogenation in a system of this

state; the complementary steric arrangement of the ligands is apparent.



These observations extend earlier results in heterogeneous⁴ and homogeneous⁶ systems. However, the degree of induced asymmetry represents an appreciable advance. Also, in this catalyst system, the asymmetric ligand may easily be varied. For example, hydrogenation of methyl phenylbutanoate (I) using (S)-(-)-lactodimethylamide as solvent gave methyl 3-phenylbutanoate (II) of $[\alpha]_D -9^\circ$. The correlation is again between the (S)-amide and the (R)-phenyl butanoate, but the hydroxy-group being much smaller than phenyl, the effective asymmetry of the ligand and the induced asymmetry is smaller in this case.

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^a Pure PhCHMe·CH₂·CO₂Me, [α]_D + or - 58° (ref. 3).

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