THE MECHANISM OF ASYMMETRIC TRANSFORMATION OF 2-SUBSTITUTED ALKANOIC ACIDS

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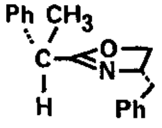
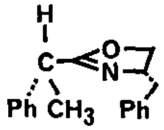
Asymmetric transformation of optically stable compounds remains a major challenge in organic synthesis (H. B. Kagan and J. C. Fiaud, "Topics in Stereochemistry," ed by E. L. Eliel and N. L. Allinger, John Wiley & Sons, Inc., New York (1978), p.229). Since preparation of optically active alkanoic acids is important, the asymmetric transformation of optically stable alkanoic acids was investigated. Oxazoline derivatives, which had been originally used by Meyers *et al*. for the asymmetric synthesis of carbonyl compounds (A. I. Meyers, Acc. Chem. Res., 11, 375 (1978)) were applied for the study of this transformation. Oxazoline derivatives of 2-phenyl and 2-chloroalkanoic acids were synthesized and the lithio oxazolines were prepared by butyllithium. The resulting lithio carbanions were quenched by addition of water, and subsequent hydrolysis of the derivatives gave 2-phenyl and 2-chloroalkanoic acids in the optical yields of 29-53% and 45-73% respectively. To elucidate this mechanism, two epimers (**1a** and **1b**) of (4S)-2-(1-phenylethyl)-4-benzyloxazoline were separated, and the each epimer was submitted to the transformation separately. In this case, deuterium oxide was used instead of water giving deuterated **1** (**1a**′ and **1b**′) to confirm the quantitative formation of the lithio carbanions. The ratios of the intermediate carbanions (**2** major and **2** minor) were measured by ^{13}C NMR, and the following relationship was disclosed.



1a



1b