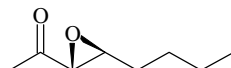


Supporting Information
Catalytic Asymmetric Epoxidation of Aliphatic Enones using Tartrate-derived Magnesium Alkoxides

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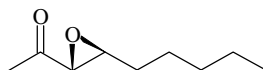
Conditions for Enantiomeric Purity Determination for Epoxyketones derived by Di-*tert*-butyl Tartrate mediated Epoxidation

(3*R*,4*S*)-1-(3-Butyl-oxiranyl)-ethanone 2a



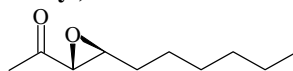
$[\alpha]_D +45.3$ (c 1.06 in CHCl_3); The absolute configuration was derived from that observed for *trans*-(3*R*,4*S*)-epoxynonan-2-one based on the assumption of a uniform reaction mechanism. Analysis by chiral phase GC indicated R_t (3*S*, 4*R*) 9.84 min and R_t (3*R*, 4*S*) 10.41 min, heptakis(2,6-di-*O*-methyl-3-*O*-pentyl)-*b*-cyclodextrin, 100 °C isothermal, indicated 91% ee.

(3*R*,4*S*)-1-(3-Pentyl-oxiranyl)-ethanone 2b



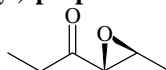
$[\alpha]_D +43.9$ (c 1.14 in CHCl_3) (lit.¹ $[\alpha]_D^{25} -38.7$, (c 0.75 in CHCl_3), 91 % ee). The absolute configuration was determined by comparing the measured optical rotation with the reported one for *trans*-(3*S*,4*R*)-epoxy-nonan-2-one. Analysis by chiral phase GC indicated R_t (3*S*, 4*R*) 11.59 min and R_t (3*R*, 4*S*) 12.16 min, heptakis(2,6-di-*O*-methyl-3-*O*-pentyl)-*b*-cyclodextrin, 110 °C isothermal, indicated 93% ee.

Preparation of (3*R*,4*S*)-1-(3-Hexyl-oxiranyl)-ethanone 2c



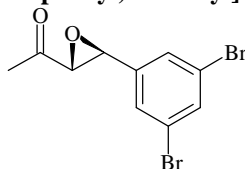
$[\alpha]_D +34.8$, (c 1.01 in CHCl_3). The absolute configuration was derived from *trans*-(3*R*,4*S*)-epoxy nonan-2-one based on the assumption of a uniform reaction mechanism.. Analysis by chiral phase GC R_t (3*S*, 4*R*) 12.74 min and R_t (3*R*, 4*S*) 13.17, heptakis(2,6-di-*O*-methyl-3-*O*-pentyl)-*b*-cyclodextrin, 120 °C isothermal, indicated 92% ee.

Preparation of (3*R*,4*S*)-1-(3-methyl-oxiranyl)-propan-1-one 2d



$[\alpha]_D +43.6$ (c 0.55 in CHCl_3). Analysis by chiral phase GC R_t (3*S*, 4*R*) 7.9 min and R_t (3*R*, 4*S*) 8.5 min, heptakis(2,6-di-*O*-methyl-3-*O*-pentyl)-*b*-cyclodextrin, 74 °C isothermal, indicated 77% ee.

Preparation of (3*R*,4*S*)-1-[3-(3,5-Dibromo-phenyl)-oxiranyl]-ethanone 2e



Mpt 78-82 °C, ee 80%, $[\alpha]_D -73.1$ (c 1.01 in CHCl_3). Enantiomeric excess was determined by chiral stationary phase HPLC analysis (DAICEL CHIRALPAK AD, *i*-PrOH-hexane=5:95, flow rate 1 ml/min, 7.55 min (3*R*,4*S*) isomer and 11.58 min (3*S*,4*R*) isomer detection at 210 nm, indicated 81% ee. The absolute configuration was determined from the X-ray structure. The crystal used for the X-ray analysis was reanalysed by HPLC, and confirmed to be the major enantiomer.

1 M. Bougauchi, S. Watanabe, T. Arai, H. Sasai, and M. Shibasaki, *J. Am. Chem. Soc.*, 1997, **119**, 2329.