

On the Creation of Chirality

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Abstract

Absolute asymmetric synthesis of chiral-at-metal Grignard reagents has been successful, and the Δ/Λ chirality of the reagents could be transferred to prochiral aldehydes.

Enantiomeric resolution of bulk quantities of seven- and eight-coordinate complexes has been achieved for the first time.

A new quantitative CD-spectroscopic method shows that recrystallization of either labile seven-coordinate enantiomer (Δ or Λ) results in exclusive formation of the Δ enantiomer for 36 consecutive crystallizations. The most likely explanation invokes cryptochirality.

Crystallization of a new copper coordination helix results in a non-stochastic distribution of homochiral *P*- and *M*-helices, which is probably caused by a cryptochiral environment. The sensitivity of crystallization-induced asymmetric transformations to cryptochirality, in relation to prebiotic homochirality, is discussed.

The possibility of using achiral ligands in the synthesis of conformationally chiral solid-state reagents, intended for stereoselective synthesis, has been demonstrated, utilizing total spontaneous resolution.

The chirality of organometallic reagents has been controlled (predetermined) using chiral ligands. The chiral ligands force the resulting complex into a specific configuration or conformation, resulting in a potentially stereoselective reagent.

Keywords: Chirality, homochirality, chiral resolution, absolute asymmetric synthesis