Asymmetric Strecker-Type Reaction of Nitrones Using Cyanohydrin

Significance: An asymmetric Strecker-type reaction of various nitrones with acetone cyanohydrin using a magnesium–(R,R)-tartramide complex was developed to successfully prepare optically active (S)-α-amino nitrile derivatives in excellent yield. Thereby, the acetone cyanohydrin serves as a less harmful and easy-to-handle synthetic equivalent of HCN and TMSCN.

Comment: The reaction mechanism is proposed to proceed as follows: first, the reaction of cyanohydrin and the (R,R)-tartramide with MeMgBr forms the corresponding bromomagnesium salts. The tartramide magnesium salt might be further deprotonated by DBU to form a magnesium ate-complex which coordinates the nitrone. Transfer of the cyano group from the cyanohydrin magnesium salt to the nitrone occurs from the re face, forming specifically the (S)-enantiomer.