Asymmetric Synthesis

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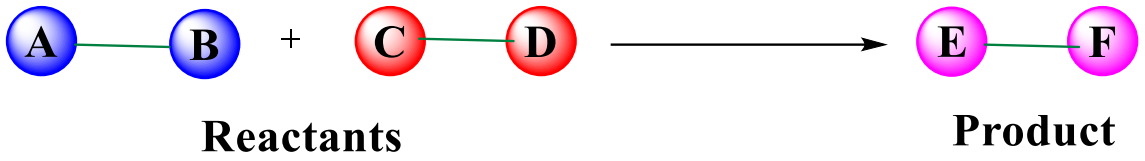
Department of Chemistry

Reaction

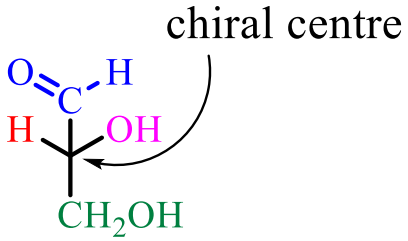


Conversion of reactant/s into product/s

Reaction

Preparation
known procedure
available idea

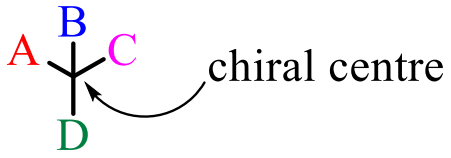
Synthesis
unknown procedure
innovative idea



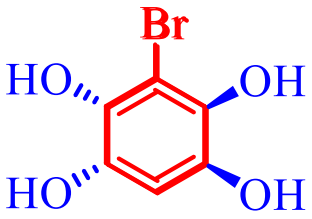
D - glyceraldehyde

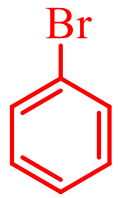
Asymmetric synthesis

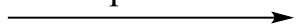
Synthesize the compound with chiral centre

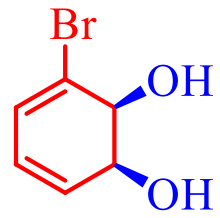


Nature is Asymmetric

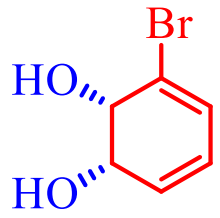




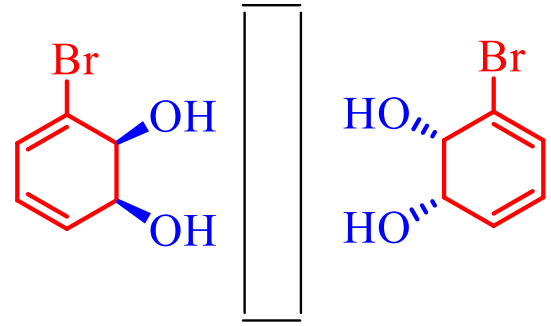




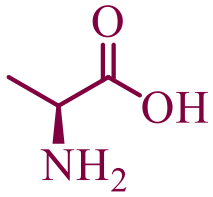
only one enantiomer



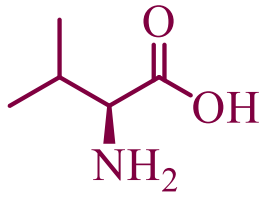
not this enantiomer



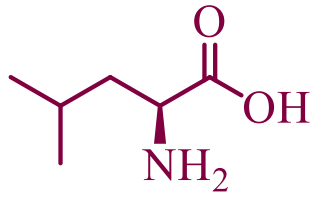
enantiomers are mirror images but non superimposable



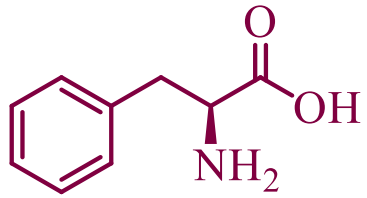
(*S*)-alanine



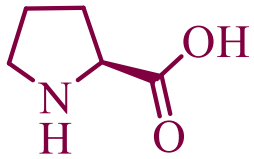
(*S*)-valine



(*S*)-leucine

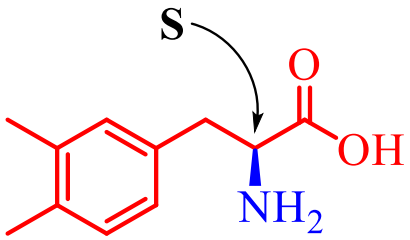


(*S*)-phenylalanine

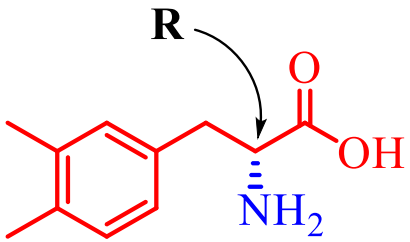


(*S*)-proline

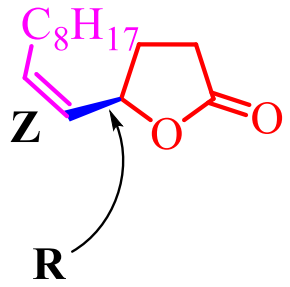
Importance of Asymmetric Synthesis



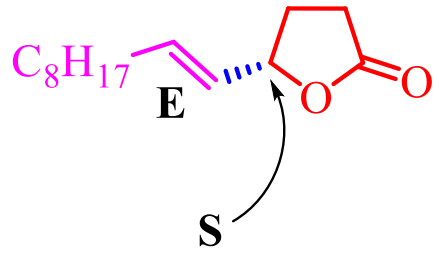
L-dopa treatment for
Parkinson's disease



D-dopa is toxic

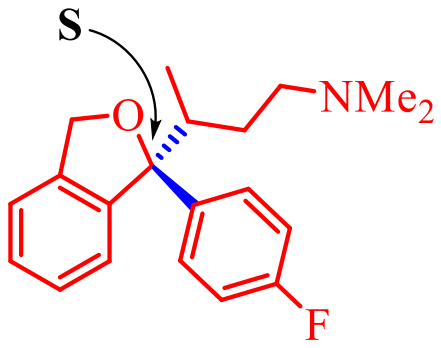


25micro gram trap
thousands of beetles

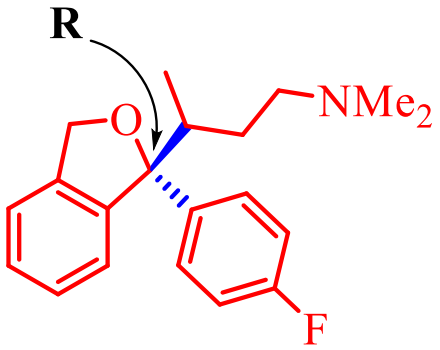


retains 10% activity and
even 1% of this compound
destroy the activity

Pheromone of Popilia japonica



(S)-citalopram
antidepressant



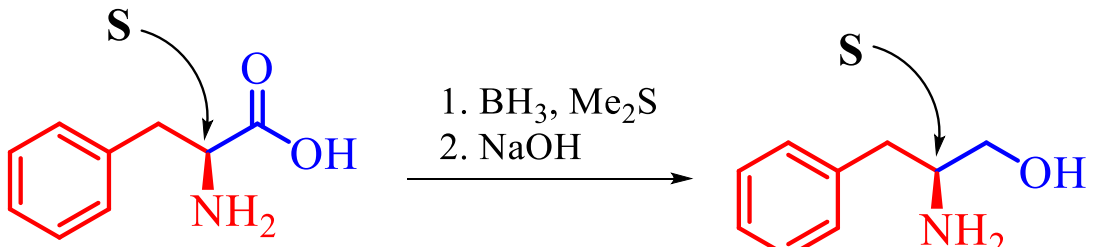
(R)-citalopram
inactive

Methods of preparation of asymmetric compounds

(1) Chiral pool method

(2) Resolution method

(1) Chiral pool method

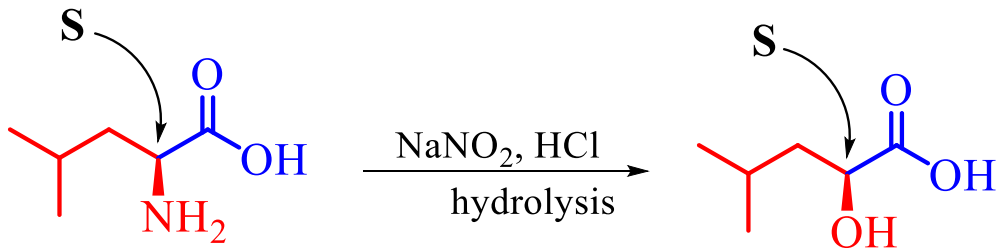


amino acid

amino alcohol

chiral pool compound
(natural, enantiomerically pure compound)

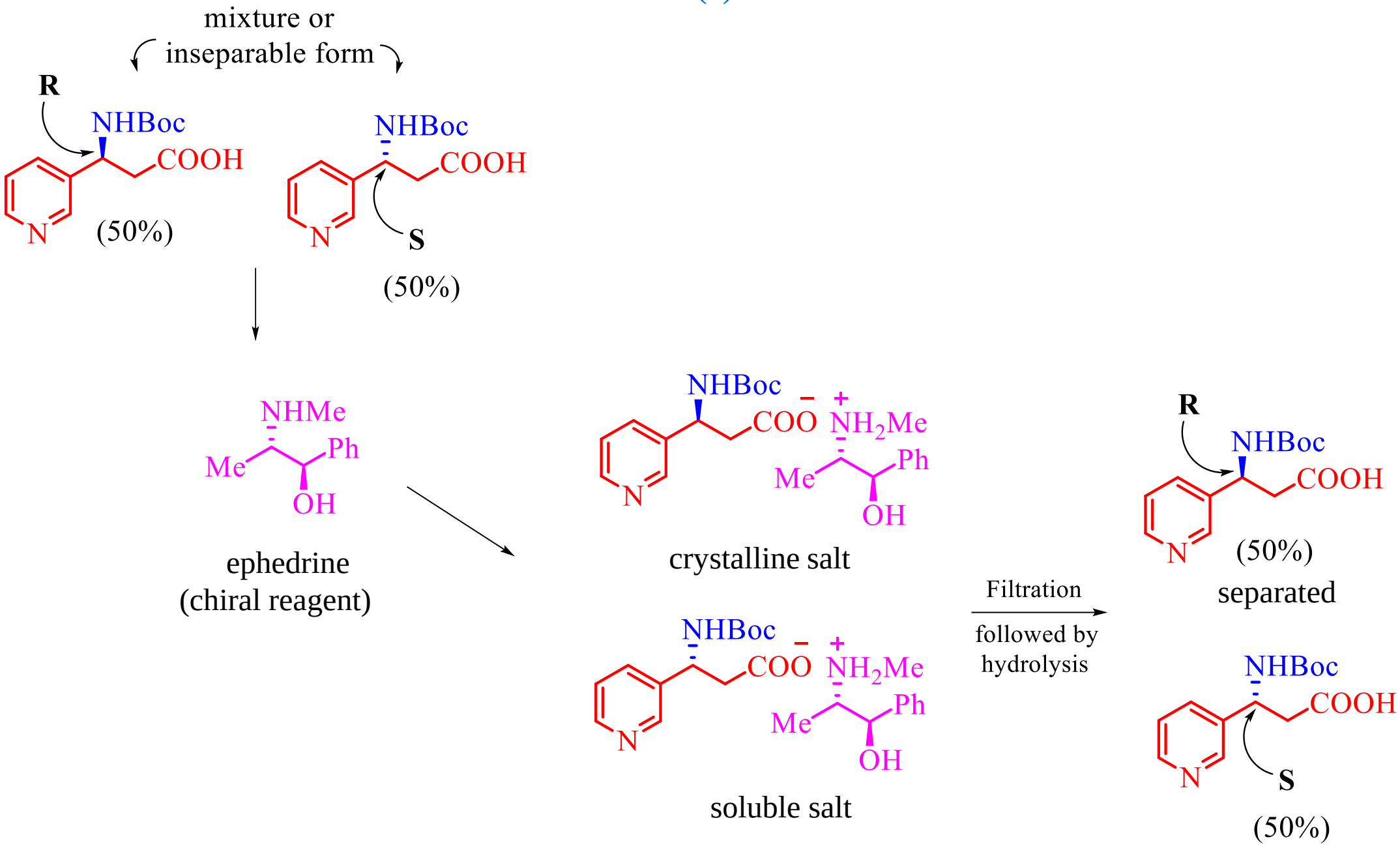
derivative of chiral pool compound



amino acid

amino alcohol

(2) Resolution method



Thank you