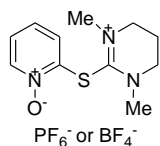
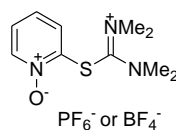
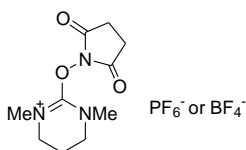


SPECIALITIES
Peptide synthesis: Coupling and protecting reagents

S-(1-Oxido-2-pyridinyl)-1,3-dimethylpropyleneuronium hexafluorophosphate or tetrafluoroborate

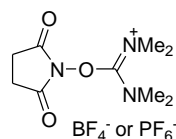
Peptide coupling and amidation reagent (*Tetrahedron Lett.* **2001**, *42*, 5013. *Tetrahedron*, **2001**, *57*, 9607. ES, 2000, P200002651)


S-(1-Oxido-2-pyridinyl)-1,1,3,3-tetramethyluronium hexafluorophosphate or tetrafluoroborate (HOTT or TOT)

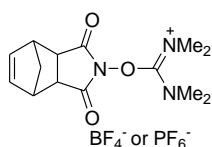
Peptide coupling and amidation reagent. Useful for the synthesis of hindered Barton esters, which are precursor of radicals (*J. Org. Chem.* **1998**, *63*, 5732. *J. Org. Chem.* **1999**, *64*, 8936. *Tetrahedron Lett.* **2000**, *41*, 9809. *Tetrahedron Lett.* **2001**, *42*, 5013)


O-Succinimidyl-1,3-dimethyl-1,3-trimethyluronium hexafluorophosphate or tetrafluoroborate

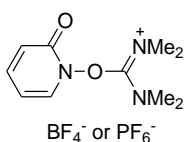
Reagent for the preparation of active succinimidyl esters (*Tetrahedron Lett.* **2002**, *43*, 1661)


2-Succinimido-1,1,3,3-tetramethyluronium tetrafluoroborate or hexafluorophosphate (TSTU or HSTU)

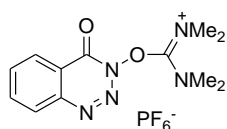
Peptide coupling reagent (*Org. Prep. Proc. Int.* **2001**, *33*, 203)


2-(5-Norbornene-2,3-carboximido)-1,1,3,3-tetramethyluronium tetrafluoroborate or hexafluorophosphate (TNTU or HNTU)

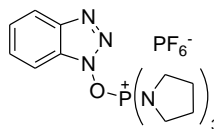
Peptide coupling reagent (*Org. Prep. Proc. Int.* **2001**, *33*, 203)


2-[2-Oxo-1(2H)-pyridyl]-1,1,3,3-tetramethyluronium tetrafluoroborate or hexafluorophosphate (TPTU or HPTU)

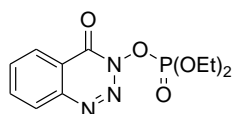
Peptide coupling reagent (*Org. Prep. Proc. Int.* **2001**, *33*, 203)


2-(3,4-Dihydro-4-oxo-1,2,3-benzotriazin-3-yl)-1,1,3,3-tetramethyluronium hexafluorophosphate (HDBTU)

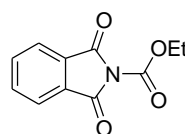
Peptide coupling reagent (*Org. Prep. Proc. Int.* **2001**, *33*, 203)


Benzotriazol-1-yl-N-oxo-tris(pyrrolidino)phosphonium hexafluorophosphate (PyBOP)

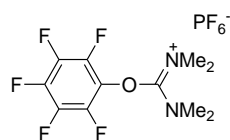
Peptide coupling reagent (*Org. Prep. Proc. Int.* **2001**, *33*, 203)


3-(Diethoxyphosphoryloxy)-1,2,3-benzotriazin-4(3H)-one (DEPBT)

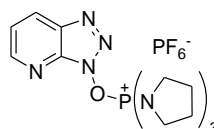
Peptide coupling reagent (*Org. Prep. Proc. Int.* **2001**, *33*, 203)


N-(Ethoxycarbonyl)-phthalimide (ECPT)

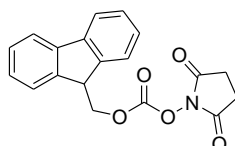
Peptide coupling reagent (*Org. Prep. Proc. Int.* **2001**, *33*, 203)


Pentafluorophenoxy-tetramethyluronium hexafluorophosphate (PFTU)

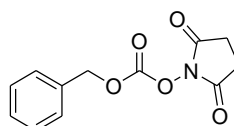
Peptide coupling reagent (*Org. Prep. Proc. Int.* **2001**, *33*, 203)


7-Azabenzotriazol-1-yl-N-oxo-tris(pyrrolidino)-phosphonium hexafluorophosphate (PyAOP)

Peptide coupling reagent (*Org. Prep. Proc. Int.* **2001**, *33*, 203)

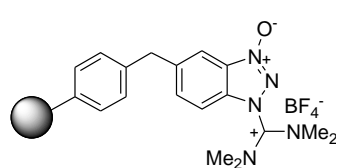

Fmoc-ONSu

Reagent for the protection with the Fmoc group


Cbz-ONSu

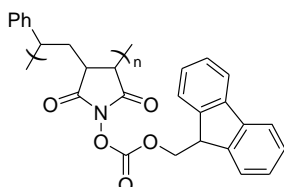
Reagent for the protection with the Cbz group

Peptide synthesis: Polymeric reagents



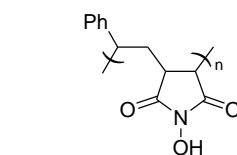
Polystyrene-bound TBTU

Solid-supported peptide-coupling reagent with easy recovery of polystyrene-bound HOBT (*Tetrahedron Lett.* **2000**, *41*, 2463)



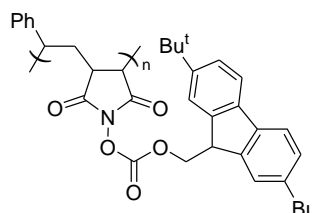
Polymeric Fmoc-OSu

Fmoc-*N*-protecting reagent with easy removal of the polymeric *N*-hydroxysuccinimide (*Tetrahedron Lett.* **2001**, *42*, 7579. Chinchilla, R.; Dodsworth, D. J.; Nájera, C.; Soriano, J. M.; Yus, M., ES, 2001, P200101169)



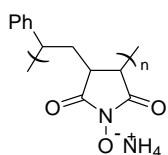
Polymeric *N*-hydroxysuccinimide

Yielding-increasing and recoverable additive in carbodiimide-mediated amidations (*Tetrahedron Lett.* **2001**, *42*, 4487)



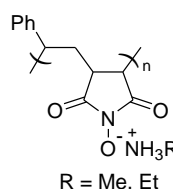
Polymeric Di-*tert*-butyl-Fmoc-OSu

Dtb-Fmoc-*N*-protecting reagent with easy removal of the polymeric *N*-hydroxysuccinimide. Dtb-Fmoc-protected amino acids have higher solubility than Fmoc-amino acids (*Bioorg. Med. Chem. Lett.* **2002**, *12*, 1817)



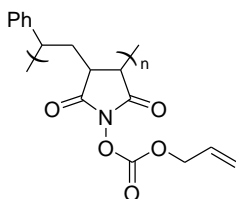
Polymeric ammonium salt of *N*-hydroxysuccinimide

Ammonia-releasing and racemization-lowering reagent in amidation reactions promoted by carbodiimides. (*Tetrahedron Lett.* **2003**, *44*, 463)



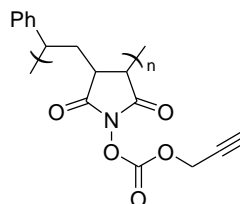
Polymeric methyl and ethylammonium salt of *N*-hydroxysuccinimide

Methyl or ethylamine-releasing and racemization-lowering reagent in amidation reactions promoted by carbodiimides (*Tetrahedron Lett.* **2003**, *44*, 463)



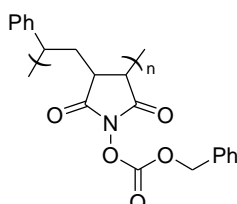
Polymeric Alloc-OSu

Allyloxycarbonyl-*N*-protecting reagent with easy removal of the polymeric *N*-hydroxysuccinimide (*Synlett*, **2003**, 809)



Polymeric Proc-OSu

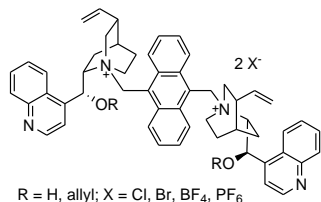
Propargyloxycarbonyl-*N*-protecting reagent with easy removal of the polymeric *N*-hydroxysuccinimide (*Synlett*, **2003**, 809)



Polymeric Cbz-OSu

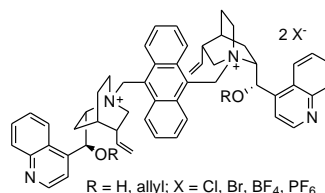
Cbz-*N*-protecting reagent with easy removal of the polymeric *N*-hydroxysuccinimide Chinchilla, R.; Dodsworth, D. J.; Nájera, C.; Soriano, J. M.; Yus, M., ES, 2001, P200101169)

Phase-transfer catalysts



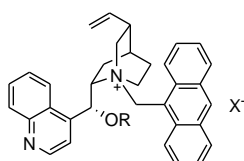
Cinchonidine-derived chiral phase-transfer catalyst for the asymmetric synthesis of amino acid derivatives (*Tetrahedron: Asymmetry*, **2002**, *13*, 927. *Tetrahedron: Asymmetry*, **2004**, *15*, 2603. *Arkivoc*, **2005**, *vi*, 222)

R = H, allyl; X = Cl, Br, BF₄, PF₆



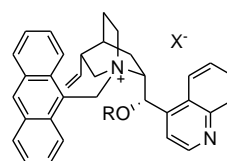
Cinchonine-derived chiral phase-transfer catalyst for the asymmetric synthesis of amino acid derivatives (*Tetrahedron: Asymmetry*, **2004**, *15*, 2603. *Arkivoc*, **2005**, *vi*, 222)

R = H, allyl; X = Cl, Br, BF₄, PF₆



Cinchonidine-derived chiral catalysts for asymmetric phase-transfer reactions

R = H, allyl; X = Cl, Br, BF₄, PF₆

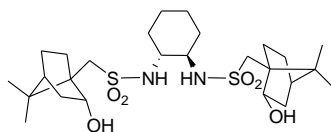


Cinchonine-derived chiral catalysts for asymmetric phase-transfer reactions

R = H, allyl; X = Cl, Br, BF₄, PF₆

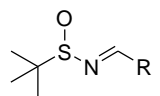
Chiral ligands and building blocks

HOCSAC



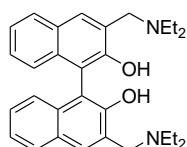
Chiral ligand for the catalytic enantioselective alkylation, arylation and vinylation of ketones (*Tetrahedron: Asymmetry* **2002**, 13, 2291. *Eur. J. Org. Chem.* **2003**, 2745. *Angew. Chem. Int. Ed.* **2004**, 43, 284. *J. Org. Chem.* **2005**, 70, 448. *Tetrahedron:Asymmetry* **2003**, 14, 1955. *J. Am. Chem. Soc.* **2005**, 127, 8355)

N-terc-Butilsulfinilaldimines



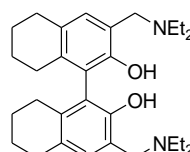
R = Alkyl, Aryl

Available in (*S*) or (*R*) form. Chiral building blocks for the enantioselective synthesis of amines (*Acc. Chem. Res.* **2002**, 35, 984. *Tetrahedron* **2004**, 60, 8003)



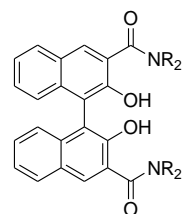
Available in (*S*) or (*R*) form

Chiral ligand for the asymmetric cyanation of aldehydes (*Chem. Eur. J.* **2005**, 11, 3849)



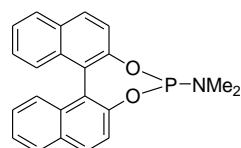
Available in (*S*) or (*R*) form

Chiral ligand for asymmetric synthesis (*Chem. Eur. J.* **2005**, 11, 3849)



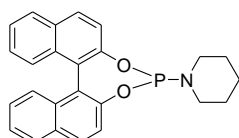
Available in (*S*) or (*R*) form

Chiral ligand for asymmetric catalysis and chiral building block (*Tetrahedron.* **1997**, 43, 17015. *Chem. Lett.* **1996**, 343)



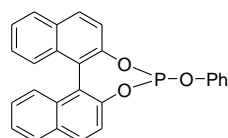
Available in (*S*) or (*R*) form

Chiral ligand in asymmetric catalysis (*Acc. Chem. Res.* **2000**, 33, 346. *Tetrahedron: Asymmetry* **2004**, 15, 1857)



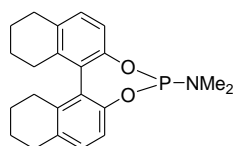
Available in (*S*) or (*R*) form

Chiral ligand in asymmetric catalysis (*Acc. Chem. Res.* **2000**, 33, 346. *Tetrahedron:Asymmetry* **2004**, 15, 1857)



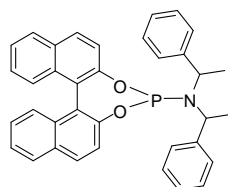
Available in (*S*) or (*R*) form

Chiral ligand in asymmetric catalysis (*Acc. Chem. Res.* **2000**, 33, 346. *Tetrahedron:Asymmetry* **2004**, 15, 1857)



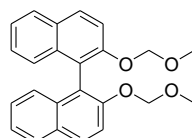
Available in (*S*) or (*R*) form

Chiral ligand in asymmetric catalysis (*Adv. Synth. Catal.* **2003**, 345, 537)



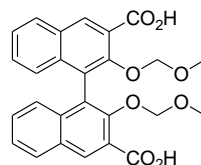
Available in all enantioenriched diastereomeric forms

Chiral ligand in asymmetric catalysis



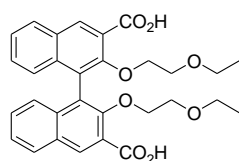
Available in (*S*) or (*R*) form

Chiral building block in asymmetric synthesis (*Chem. Rev.* **2003**, 103, 3155)



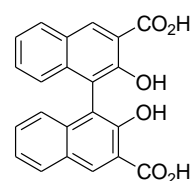
Available in (*S*) or (*R*) form

Chiral building block in asymmetric synthesis (*Chem. Rev.* **2003**, 103, 3155)



Available in (*S*) or (*R*) form

Chiral building block in asymmetric synthesis (*Chem. Rev.* **2003**, 103, 3155)

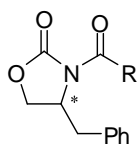


Available in (*S*) or (*R*) form

Chiral building block in asymmetric synthesis (*Chem. Rev.* **2003**, 103, 3155)

SPECIALITIES

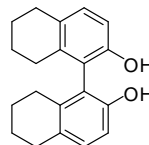
Chiral ligands and building blocks (cont.)



3-Acyl-4-benzyloxazolidinones

Available in (*S*) or (*R*) form

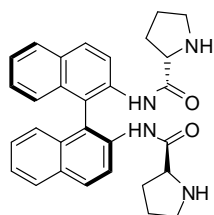
Chiral auxiliaries in asymmetric synthesis



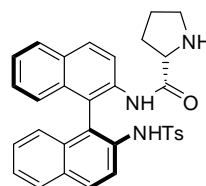
Available in (*S*) or (*R*) form

Chiral building block in asymmetric catalysis (*Adv. Synth. Catal.* **2003**, 345, 537)

Organocatalysts

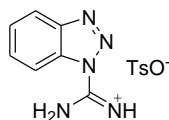


(*S*)-Binam-L-Bisprolinamide for the asymmetric direct aldol reaction (*J. Org. Chem.* **2008**, 73, 5933)



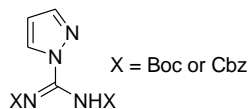
N-Tosyl-(*Sa*)-Binam-L-Prolinamide for the asymmetric intramolecular direct aldol reaction (*Synlett*, **2008**, 3031)

Guanylyating reagents



Benzotriazole-1-carboxamidinium p-toluenesulfonate (BCBT)

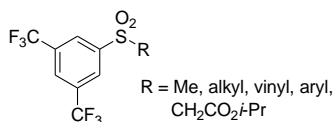
Reagent for guanylation (*Synth. Commun.* **1995**, 25, 1173)



N,N'-Di-Boc- or *N,N'*-Di-Cbz-1*H*-pyrazole-1-carboxamide

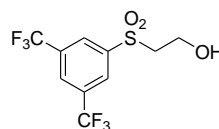
Reagents for guanylation (*Tetrahedron Lett.* **1993**, 34, 3389)

Electron-deficient sulfones



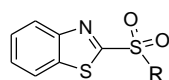
3,5-Bis(trifluoromethyl)phenyl sulfones

More easily removable by β -elimination than conventional sulfones. Useful for direct Julia-Kocienski olefinations (*J. Org. Chem.* **2005**, 70, 6404)



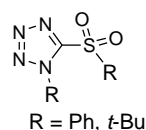
2-[3,5-Bis(trifluoromethyl)phenyl]ethanol

Carboxylic acid protecting group easily removed under mild basic conditions (*Synthesis* **2003**, 277)



2-Benzo[d]thiazolyl sulfones

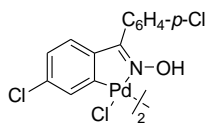
More easily removable by β -elimination than conventional sulfones. Useful for direct Julia-Kocienski olefinations (*J. Chem. Soc. Perkin Trans. 1* **2002**, 2563)



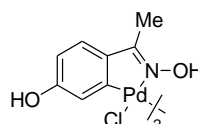
1-Phenyl- or 1-tert-butyl-1*H*-tetrazol-5-yl sulfones

More easily removable by β -elimination than conventional sulfones. Useful for direct Julia-Kocienski olefinations (*J. Chem. Soc. Perkin Trans. 1* **2002**, 2563)

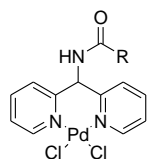
Palladium catalysts



Very active catalysts for carbon-carbon coupling reactions (*Org. Lett.* **2000**, 2, 1823. *Adv. Synth. Catal.* **2002**, 344, 172. *J. Org. Chem.* **2002**, 67, 5588. *Tetrahedron Lett.* **2002**, 43, 9365. *Adv. Synth. Catal.* **2003**, 345, 1146. *J. Org. Chem.* **2004**, 69, 1615)

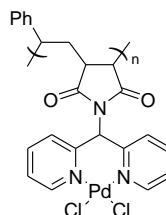


Very active catalysts for carbon-carbon coupling reactions in aqueous solvents (*Angew. Chem. Int. Ed.* **2002**, 41, 179. *J. Organomet. Chem.* **2002**, 663, 46. *Tetrahedron Lett.* **2004**, 45, 1833. *Tetrahedron* **2004**, 60, 5563. *J. Org. Chem.* **2005**, 70, 4360. *Tetrahedron* **2005**, 61, 9688)



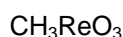
R = Me, NHC₆H₁₁

Catalyst for carbon-carbon coupling reactions in organic and aqueous solvents (*Org. Lett.* **2003**, 5, 1451. *Adv. Synth. Catal.* **2004**, 346, 1798. *Eur. J. Org. Chem.* **2005**, 4073)



Recoverable catalyst for carbon-carbon coupling reactions in organic and aqueous solvents (*Tetrahedron* **2005**, 61, 12168)

Other transition metal catalysts



Methyltrioxorhenium

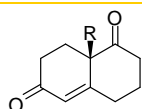
Oxidation catalyst in many applications (*Chemtracts* **2001**, 14, 59)



Dichloro[tetrakis(dimethyl sulphoxide)]ruthenium(II)

Catalyst for the selective α -alkylation of ketones using alcohols as electrophilic agents (*Tetrahedron Lett.* **2005**, 46, 3683)

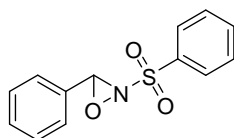
Wieland–Miescher Ketone and Analogues



R = Me, Et, Allyl, Benzyl, Propargyl, CH₂CH₂CO₂Me, ...

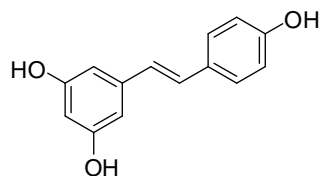
Starting materials for the synthesis of a wide variety of terpenoids and steroids

Oxidation Reagents

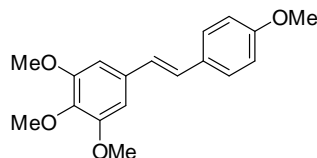


3-phenyl-2-(phenylsulfonyl)-1,2-oxaziridine

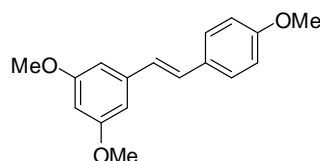
Pharmacologically active compounds and intermediates


Resveratrol

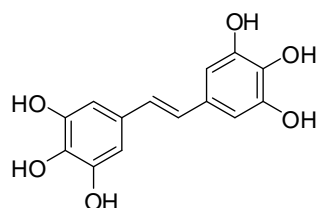
Antioxidant phytoalexin (*Resveratrol in Health and Disease*, Taylor & Francis, 2006; *Tetrahedron Lett.* **2009**, 50, 3070)


DMU-212

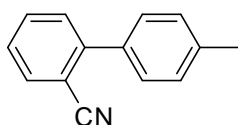
Anticancer agent (*Cancer. Chemother. Pharmacol.* **2008**, 63, 27; *Tetrahedron Lett.* **2009**, 50, 3070)


M5

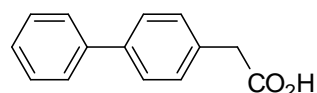
Anticancer agent (*Oncol. Rep.* **2008**, 19, 1621; *Tetrahedron Lett.* **2009**, 50, 3070)


M8

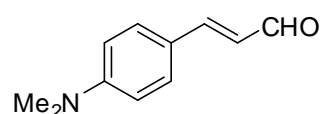
Anticancer agent (*Anticancer Res.* **2007**, 27, 3459; *Cancer. Chemother. Pharmacol.* **2008**, 63, 27; *Tetrahedron Lett.* **2009**, 50, 3070)


4'-methylbiphenyl-2-carbonitrile

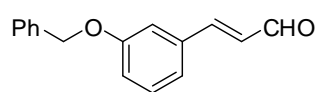
Antihypertensive drug intermediate (Sartans) (*Angew. Chem. Int. Ed.* **2002**, 41, 179; *J. Organomet. Chem.* **2002**, 663, 46; *Org. Lett.* **2008**, 10, 5011).


Felbinac

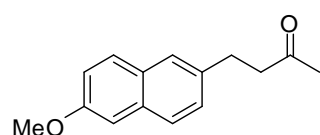
Antiinflammatory (*Angew. Chem. Int. Ed.* **2002**, 41, 179; *J. Organomet. Chem.* **2002**, 663, 46; *Org. Lett.* **2008**, 10, 5011).


(E)-4-(dimethylamino)-cinnamaldehyde

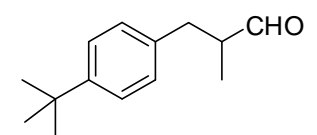
Unit for non-linear optics (*Tetrahedron* **2005**, 61, 9688; *Eur. J. Org. Chem.* **2008**, 3102).


(E)-3-(benzyloxy)-cinnamaldehyde

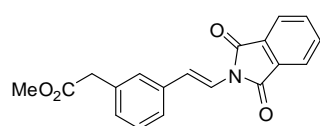
Inhibitory activity against cyclin-dependent (*Tetrahedron* **2005**, 61, 9688; *Eur. J. Org. Chem.* **2008**, 3102).


Nabumetone

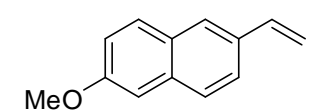
Non steroidal anti-inflammatory (*Adv. Synth. Catal.* **2007**, 349, 2572)


 β -Lilial

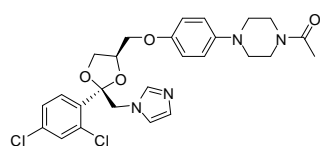
Fragrance and intermediate of fungicide fenpropimorph (Corbel $\text{\textcircled{R}}$) (*Adv. Synth. Catal.* **2007**, 349, 2572)


(E)-methyl 2-(3-(2-(1,3-dioxisoindolin-2-yl)vinyl)phenyl)acetate

Main unit of a β 2 adrenoreceptor agonist (*Adv. Synth. Catal.* **2008**, 350, 1316).

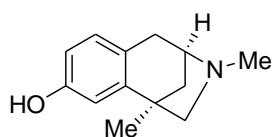

2-methoxy-6-vinylnaphthalene

Precursor of antiinflammatory naproxene (*Adv. Synth. Catal.* **2006**, 348, 2085; *J. Org. Chem.* **2009**, 74, 2321)


Ketokonazol impurities

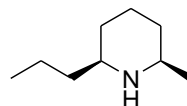
SPECIALITIES

Nitrogen containing heterocycles



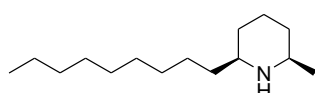
(-)-Aphanorphine

Tricyclic alkaloid structurally related to benzomorphan analgesics



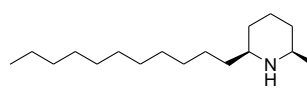
(+)-Dihydropinidine

Defense alkaloid of the Mexican bean beetle *Epilachna varivestis*



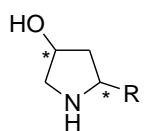
(+)-Isosolenopsin

Venom alkaloid of fire ants



(+)-Isosolenopsin A

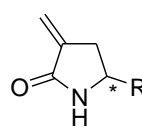
Venom alkaloid of fire ants



R = Alkyl, Aryl

Pyrrolidin-3-ols

Availables in enantiomerically pure form. Chiral building blocks for the enantioselective synthesis of amines. Promising organocatalysts.

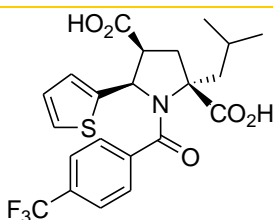


R = Alkyl, Aryl

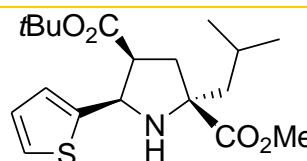
α -Methylene- γ -butyrolactams

Availables in enantiomerically pure form. Chiral building blocks for the enantioselective synthesis of amines.

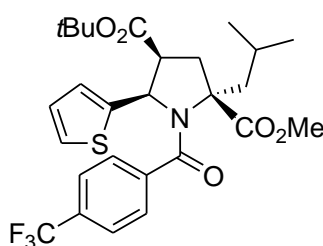
Hepatitis C virus antiviral drugs and analogues



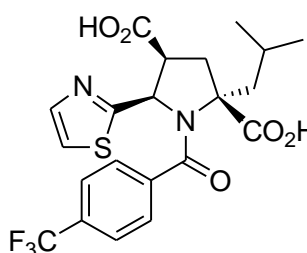
(2S,4S,5R)-2,4-Pyrrolidinedicarboxylic acid, 2-(2-methylpropyl)-5-(2-thienyl)-1-[4-(trifluoromethyl)benzoyl]



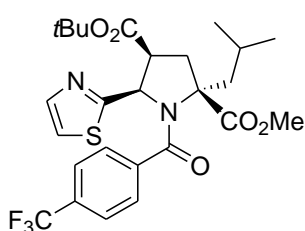
(2S,4S,5R)-2,4-Pyrrolidinedicarboxylic acid, 2-(2-methylpropyl)-5-(2-thienyl)-4-(1,1-dimethylethyl)-2-methyl ester



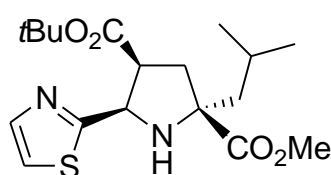
(2S,4S,5R)-2,4-Pyrrolidinedicarboxylic acid, 2-(2-methylpropyl)-5-(2-thienyl)-1-[4-(trifluoromethyl)benzoyl]-4-(1,1-dimethylethyl)-2-methyl ester



(2S,4S,5R)-2,4-Pyrrolidinedicarboxylic acid, 2-(2-methylpropyl)-5-(2-thiazolyl)-1-[4-(trifluoromethyl)benzoyl]



(2S,4S,5R)-2,4-Pyrrolidinedicarboxylic acid, 2-(2-methylpropyl)-5-(2-thiazolyl)-1-[4-(trifluoromethyl)benzoyl]-4-(1,1-dimethylethyl)-2-methyl ester



(2S,4S,5R)-2,4-Pyrrolidinedicarboxylic acid, 2-(2-methylpropyl)-5-(2-thiazolyl)-4-(1,1-dimethylethyl)-2-methyl ester