This feature focuses on a reagent chosen by a postgraduate, highlighting the uses and preparation of the reagent in current research

**Introduction**

α-Amido sulfones have emerged as valuable precursors of imines in enantioselective nucleophilic addition reactions because their use offers several advantages. Imines are generated in situ from α-amido sulfones by the elimination of the sulfone group under basic or acid conditions. The in situ formation avoids the competitive enolization process that often occurs when using imines and which hinders an effective nucleophilic addition. Moreover, unlike imines, α-amido sulfones are stable solids which can be easily synthesized and stored for a long period of time.

**Preparation**

Various methodologies have been described for the synthesis of diverse α-amido sulfones. The most extended preparation method consists of a three-component coupling of aldehyde, carbamate (or a proper nitrogenated compound, such as an amide) and sodium p-toluene-sulfinate.

![Scheme 1](image)

**Abstracts**

(A) Mannich Reaction

α-Amido sulfones are used as aliphatic imine precursors in the catalytic asymmetric Mannich reaction with glycine derivative 5. Linear, branched or cyclic substrates give the corresponding products in excellent diastereo- and enantioselectivities. Noteworthy are the use of formaldehyde-derived α-amido sulfone for α-aminomethylation of glycine derivatives and the selective orthogonal N-deprotection of the obtained β-alkyl-α,β-diamino acid derivatives 6.

(B) Hydrophosphonylation

Enantioenriched α-amino phosphoric acid derivatives 8 can be synthesized by the asymmetric hydrophosphonylation of aliphatic N-Cbz and N-Boc α-amido sulfones 3 using a phase-transfer catalyst. High yields and enantioselectivities are afforded.

(C) Cycloaddition

Propionyl chloride 9 and α-amido sulfones as precursors of N-thioacylimines undergo catalytic asymmetric [4+2] cycloadditions with excellent enantio- and diastereoselectivities. The in situ formation of the imine is crucial to overcome its tautomerization to the enamine. The final enantioenriched thiazinone adducts 10 behave as activated ester surrogates.
SO₂Tol SO₂Tol P
SO₂Ph Boc L
SO₂Ph
NO₂ L

References
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A. Monleón
sulfones has also been reported. 10b The aza-Henry reaction of
conditions have also been successfully applied to the asymmetric
addition of nitroalkanes to
organometallic reagents. High enantioselectivities are obtained with
α-amido sulfones was developed by Feringa and co-workers. Dipolar
insertion reactions of aliphatic nucleophiles. However, the introduction of the methyl group is
achieved with Me₃Al. High enantioselectivities are obtained with
para- and meta-substituted substrates, whereas ortho-substituted
and aliphatic α-amido sulfones lead to a low enantiomeric excess. 8

(E) Strecker Reaction
Differently N-protected aromatic α-amido sulfones undergo the
organocatalytic enantioselective cyanation catalyzed by quinine. KCN
is used as the cyanide source. The cyanated products 12 are obtained in good yields and enantioselectivities. 7a The asymmetric Strecker reaction with aliphatic α-amido sulfones has also been carried out. 7b

(F) Alkynylation
Several N-Cbz protected propargylic amines 14 are prepared by the
catalytic enantioselective addition of aromatic alkynes 13 to imines
in situ generated from aromatic α-amido sulfones using Et₂Zn and a
BINOL-type ligand. Further transformations of the alkynylation
products were successfully achieved. 8

(G) Aza-Henry Reaction
The asymmetric addition of nitroalkanes to N-Boc imines, in situ
formed from α-amido sulfones, is performed in the presence of a
novel rosin-derived thiourea catalyst and a base. The reaction proceeds in a doubly stereocontrolled manner with high enantioselectivities and moderate diastereoselectivities. 9a Catalytic phase transfer conditions have also been successfully applied to the asymmetric aza-Henry reaction of α-amido sulfones. 9b

(H) Aza-Morita–Baylis–Hillman Reaction
N-Boc α-amido sulfones are demonstrated to be suitable imine pre-
cursors in the asymmetric addition of vinyl methyl ketone catalyzed
by a BINOL-derived catalyst. Moderate to high yields and enantio-
selectivities are afforded. 10a The enantioselective aza-Baylis–Hillman-type reaction with αβ-unsaturated aldehydes and α-amido sulfones has also been reported. 10b

References
(1) (a) Petmini, M. Chem. Rev. 2005, 105, 3949. (b) Yin, B.;
(2) (a) Engberts, J. B. F. N.; Strating, J. Rec. Trav. Chim. Pays-
Bas 1964, 83, 733. (b) Schöllkopf, U.; Blume, E.
(3) Hernando, E.; Arrayás, R. G.; Carretero, J. C. Chem.
(4) Fini, F.; Micheletti, G.; Bernardi, L.; Pettersen, D.; Fochi,
129, 11690.
2008, 73, 940.
2007, 48, 1337.
J. 2012, 18, 2440.
(9) (a) Jiang, X.; Zhang, Y.; Wu, L.; Zhang, G.; Liu, X.; Zhang,
(b) Gómez-Bengoa, E.; Linden, A.; López, R.; Mújica-
2008, 130, 7955.
(10) (a) Guan, X.-Y.; Wei, Y.; Shi, M. Eur. J. Org. Chem. 2010,
4098. (b) Čihalová, S.; Remč, M.; Cisařová, I.; Veselý, J.