

SUPPORTING INFORMATION

Bismuth(III) triflate promoted intramolecular hydroamination of unactivated alkenyl sulfonamides in the preparation of pyrrolidines

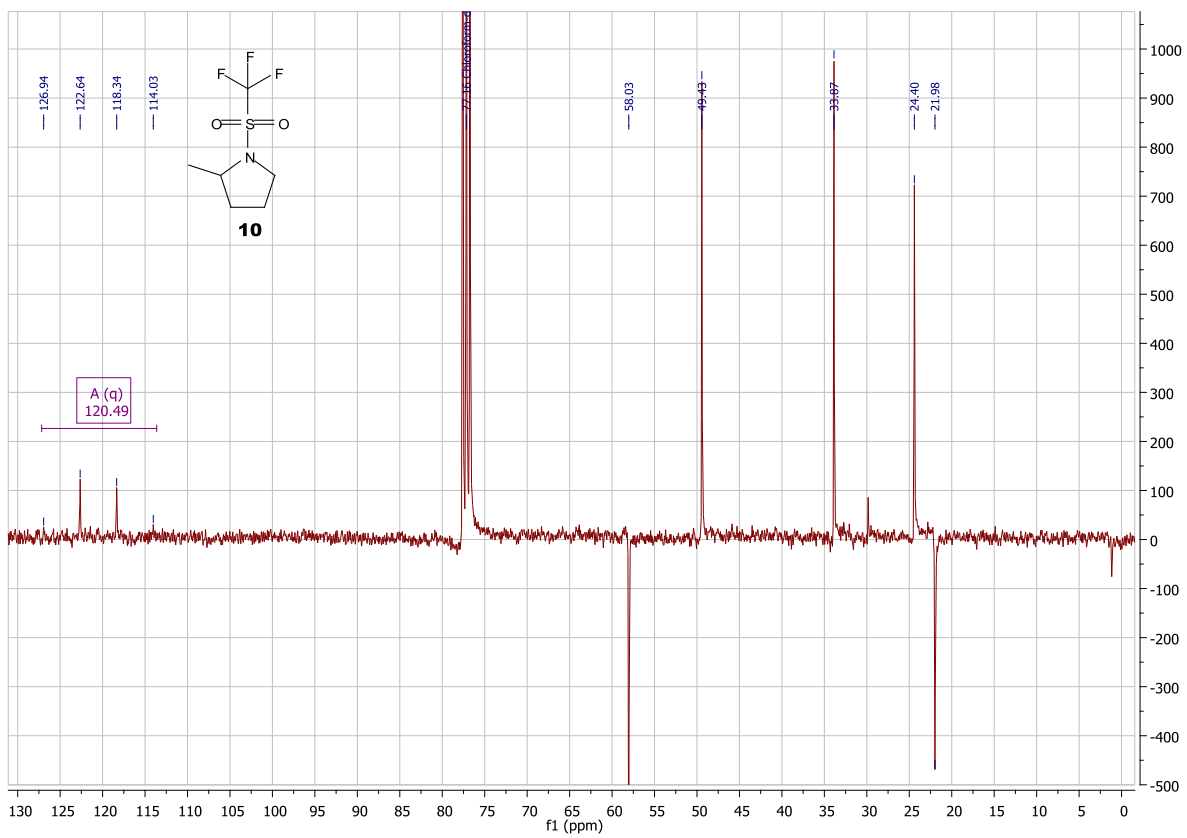
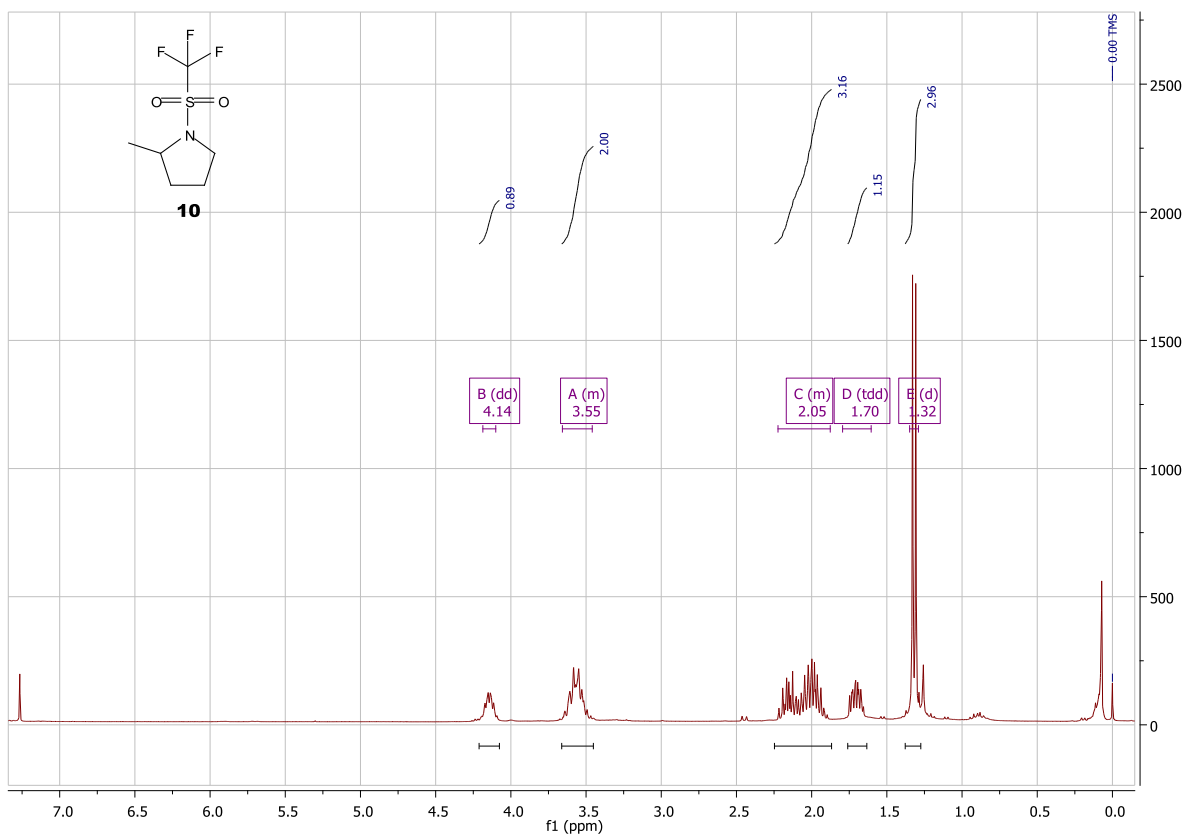
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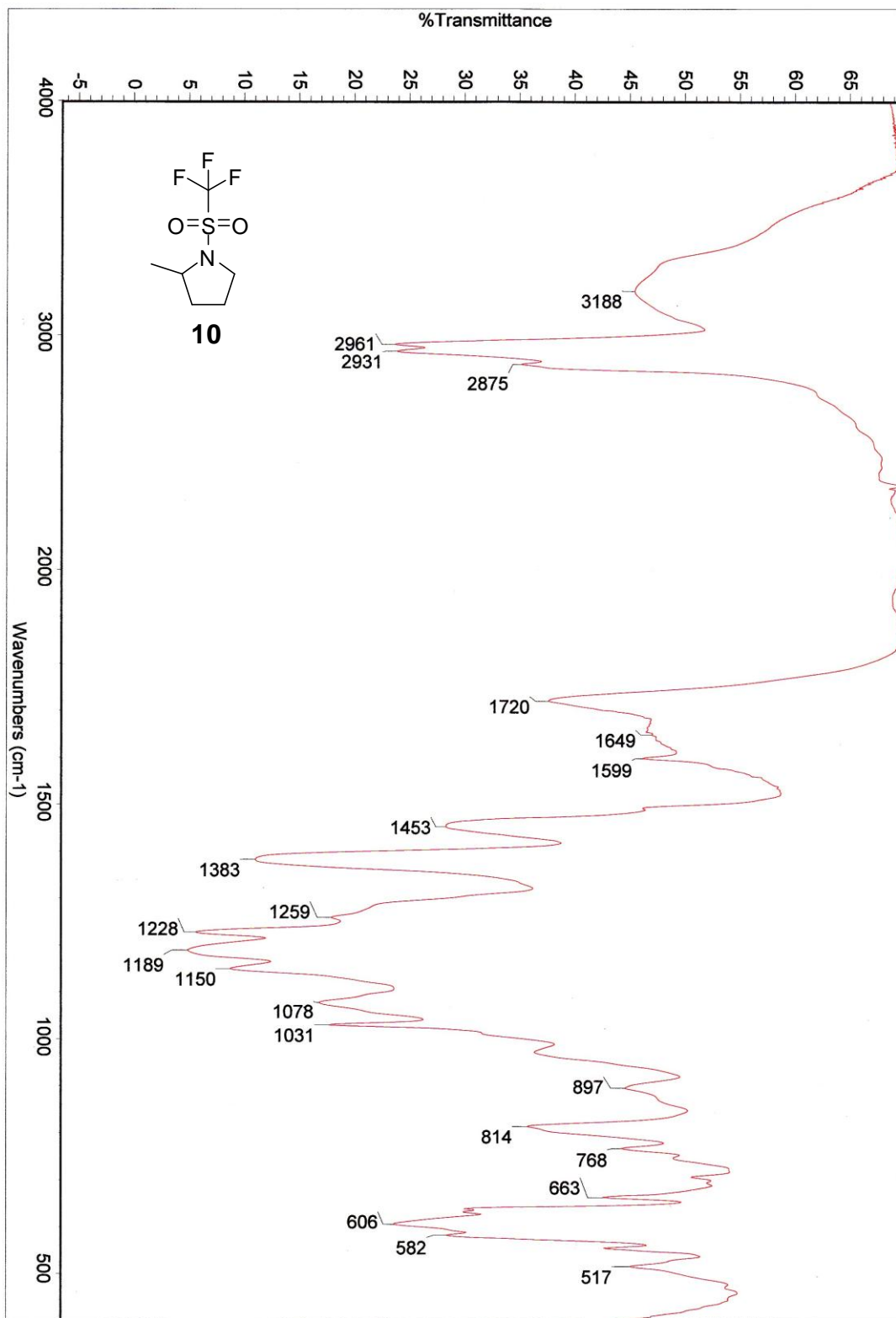
*Dept. of Organic Chemistry, Slovak University of Technology,
Radlinského 9, SK-812 37 Bratislava, Slovakia.*

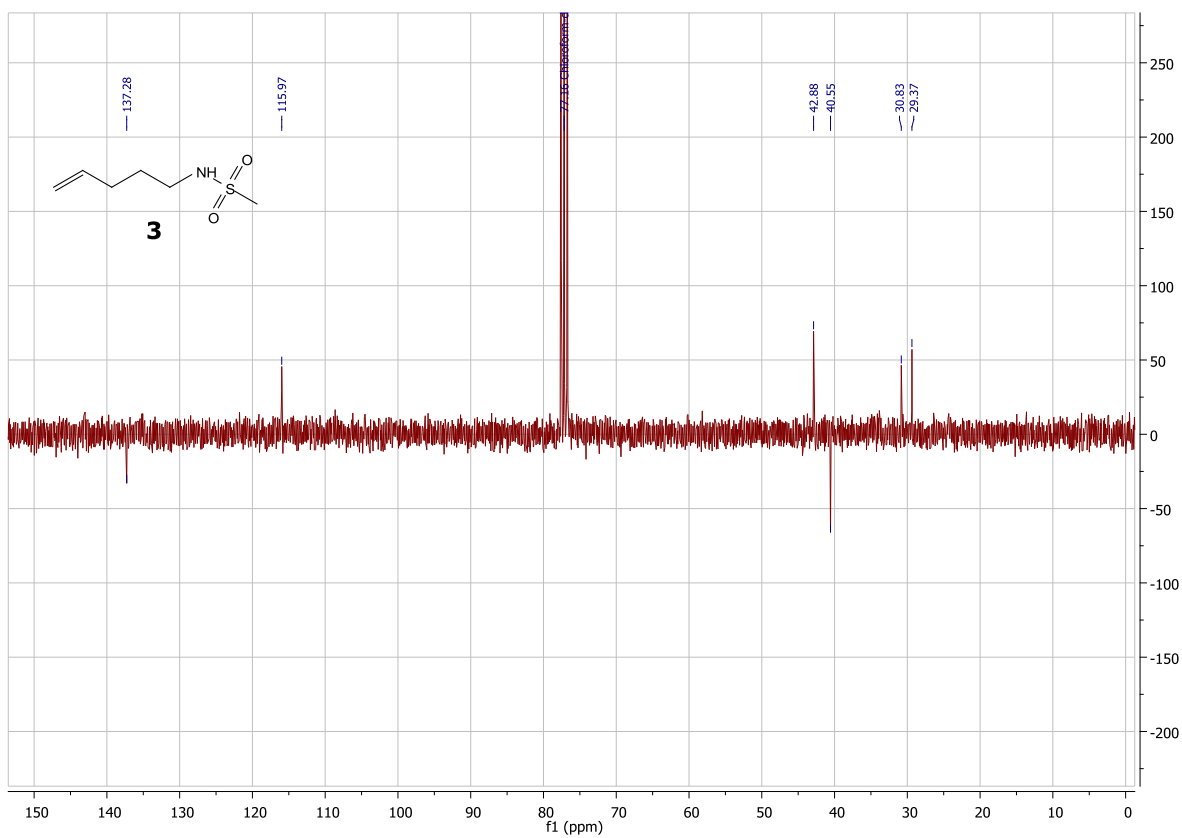
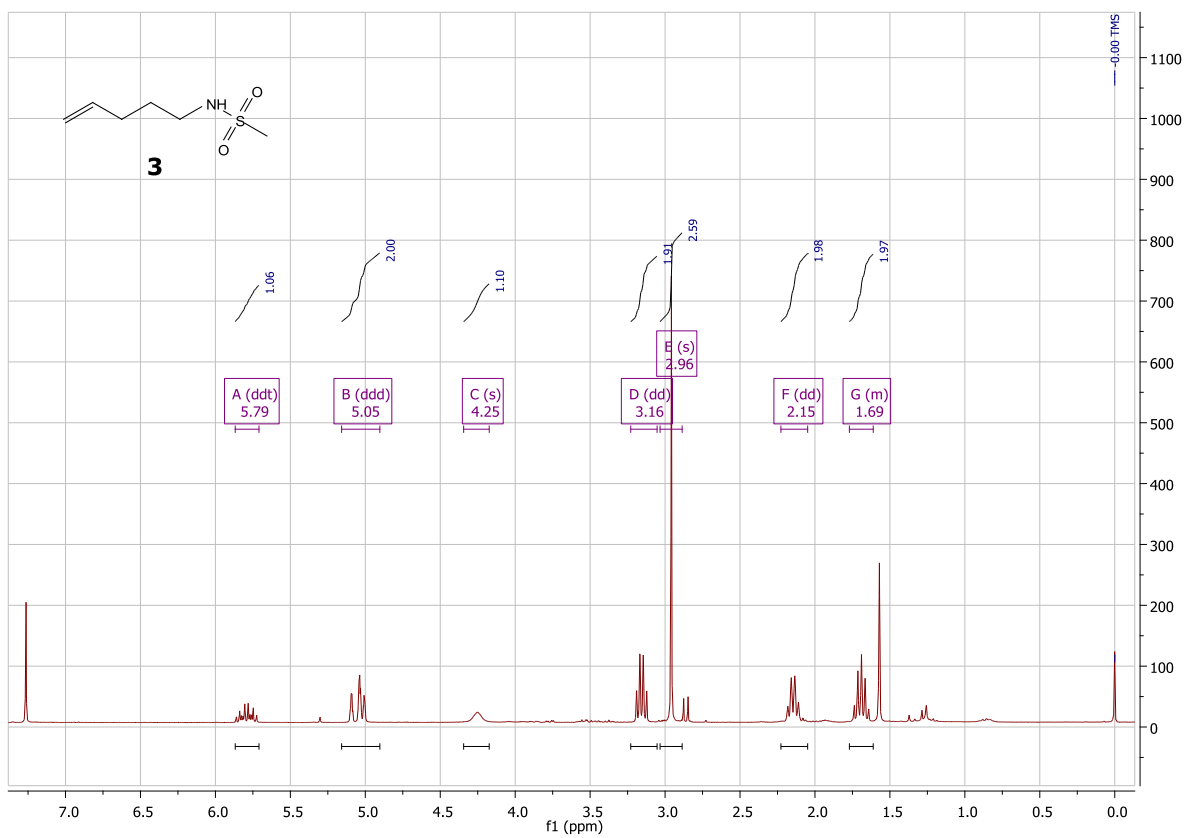
E-mail: peter.szolcsanyi@stuba.sk

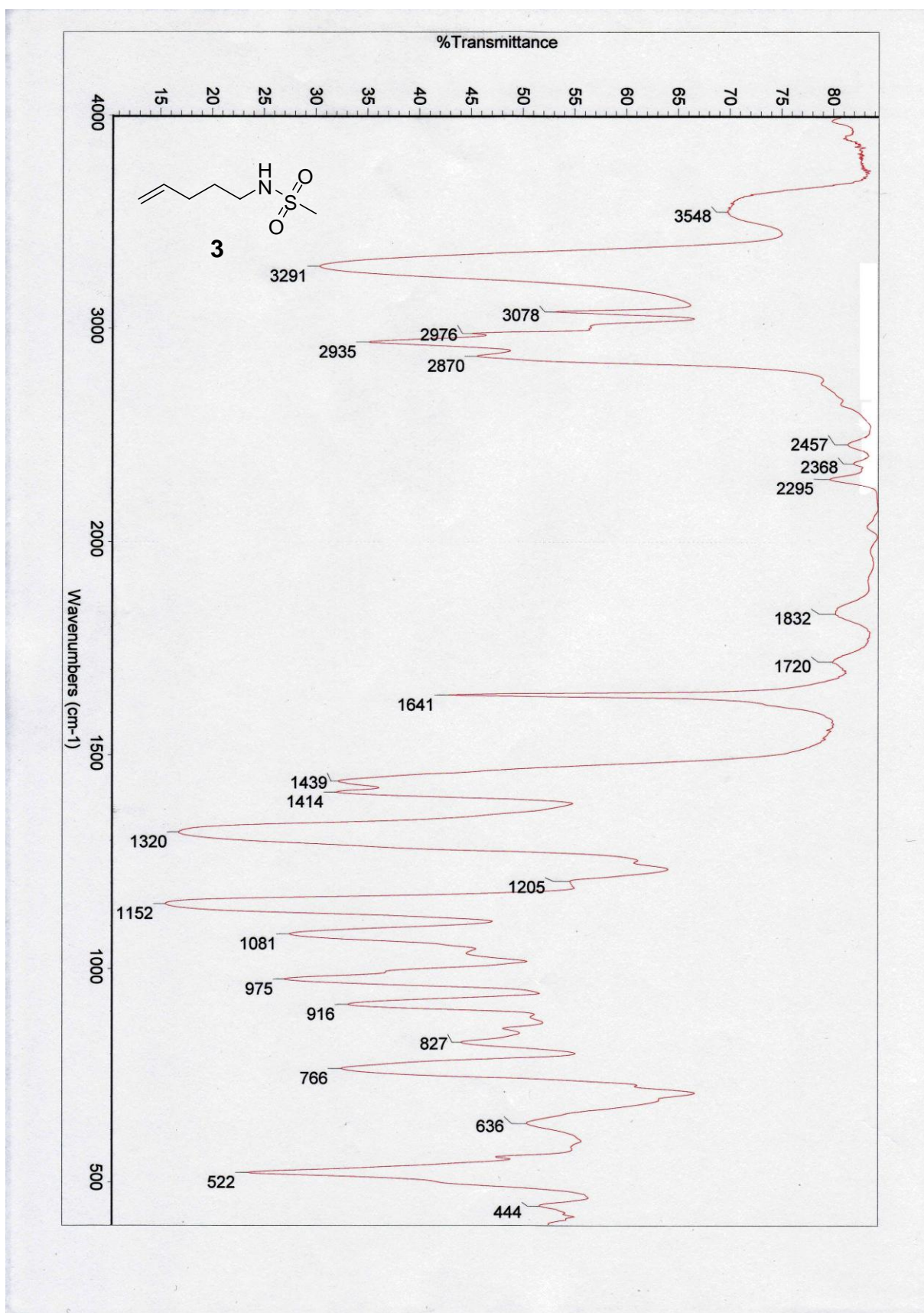
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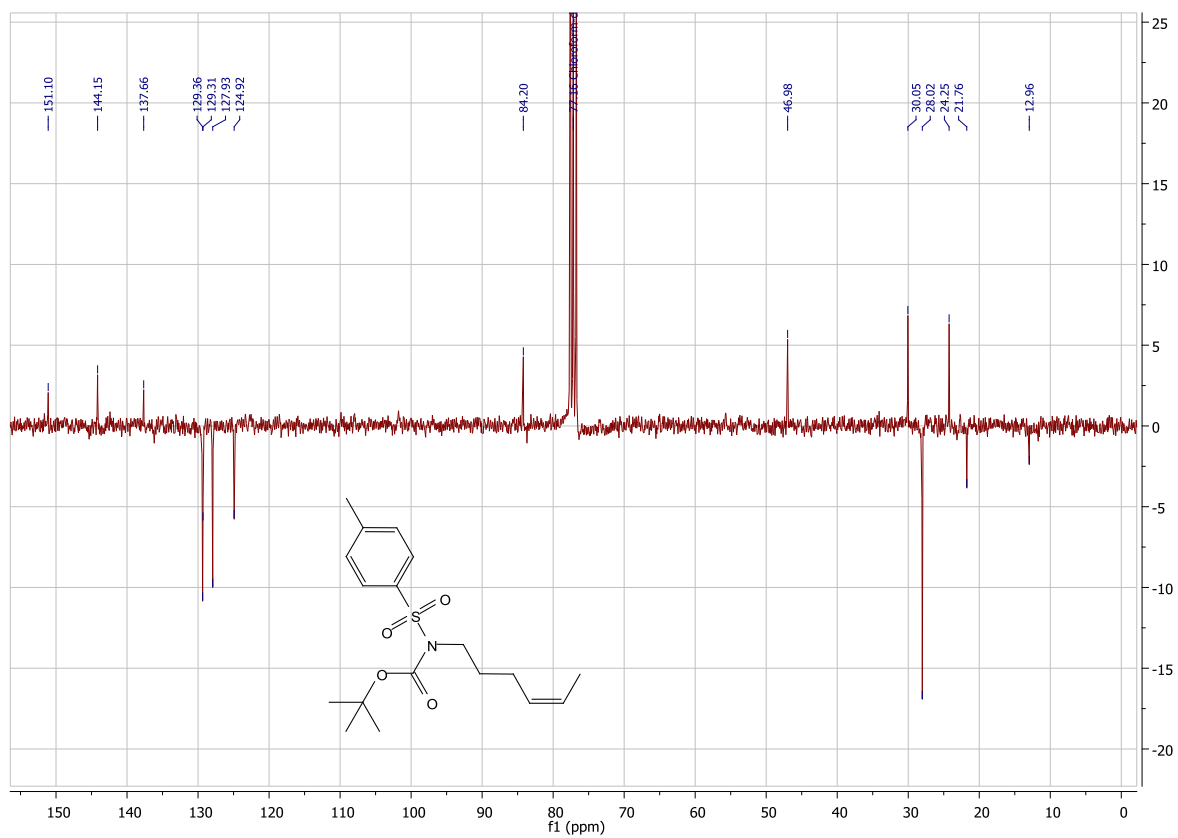
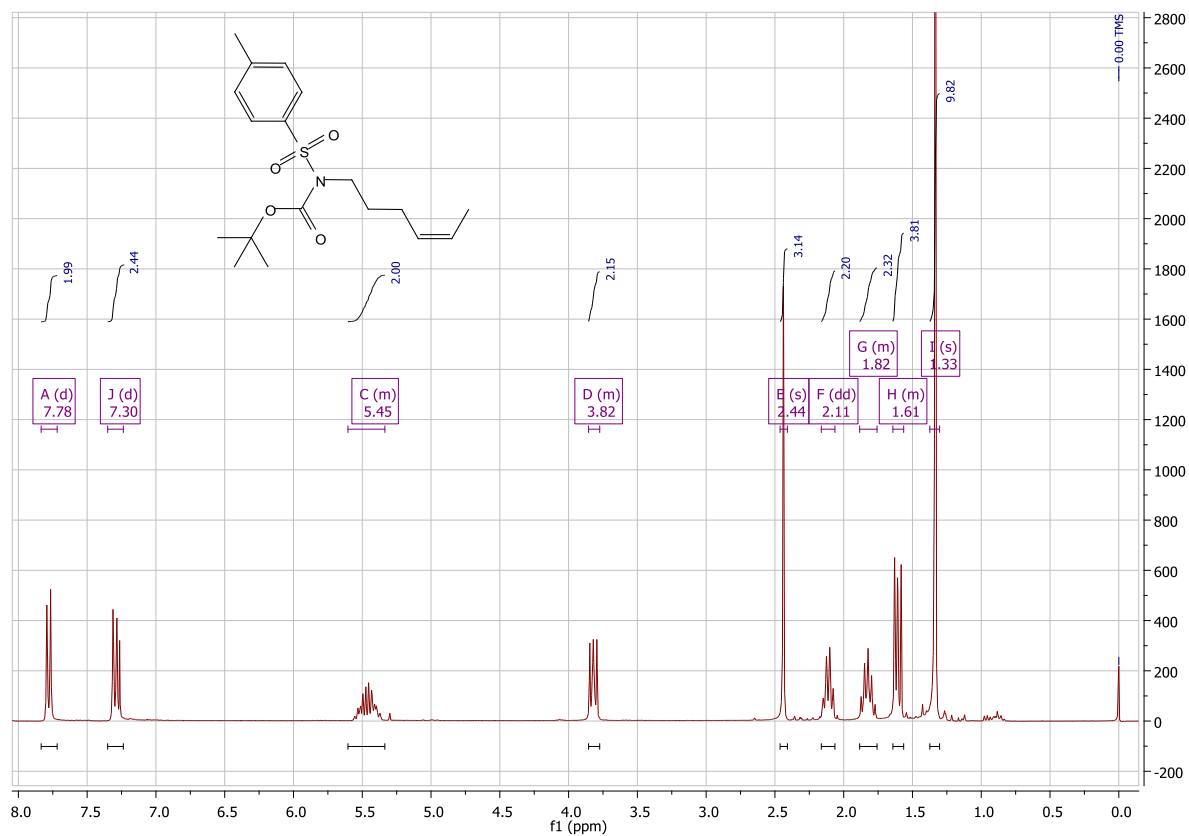
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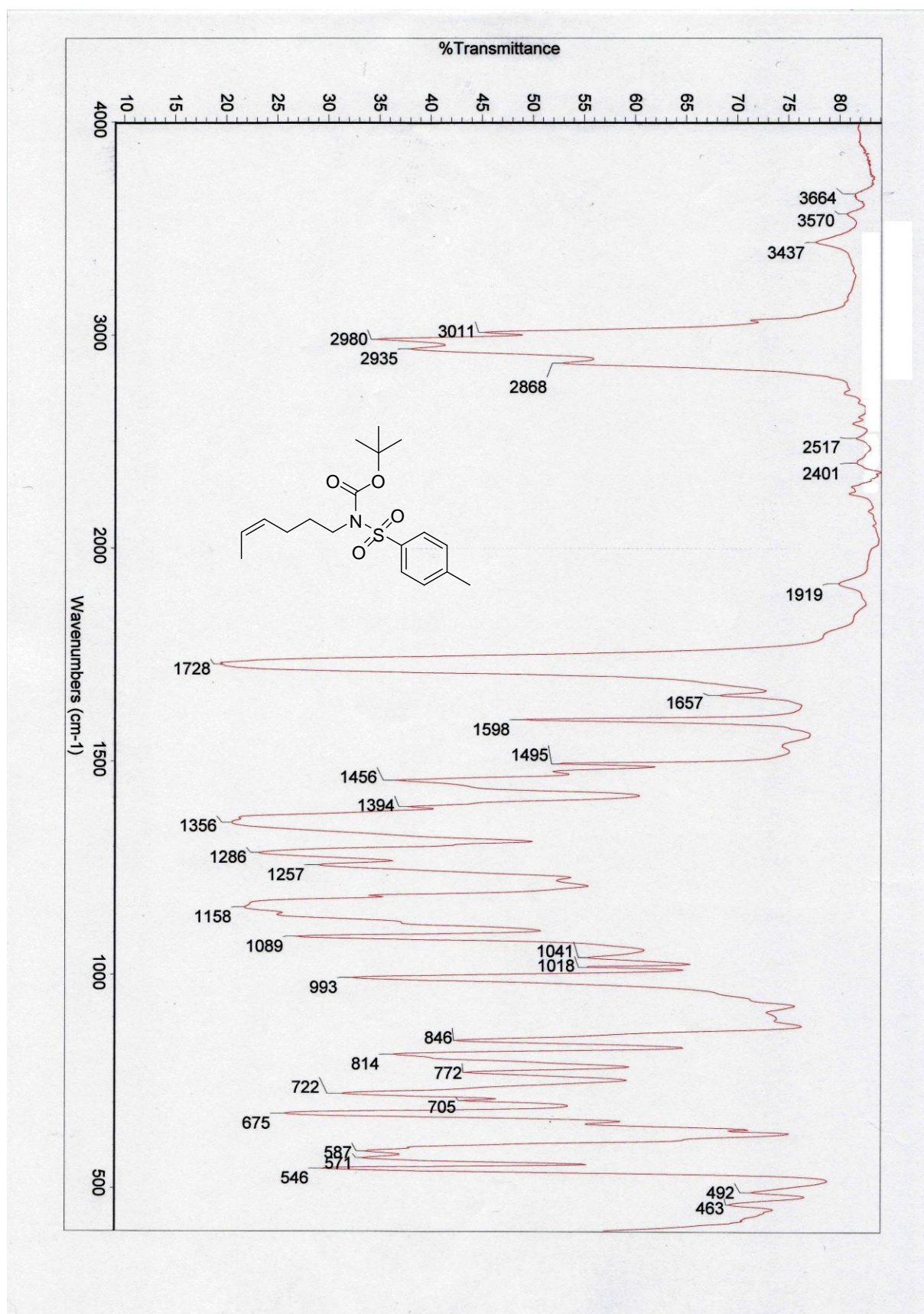












General procedure for the bismuth triflate-catalysed hydroamination with chiral ligands

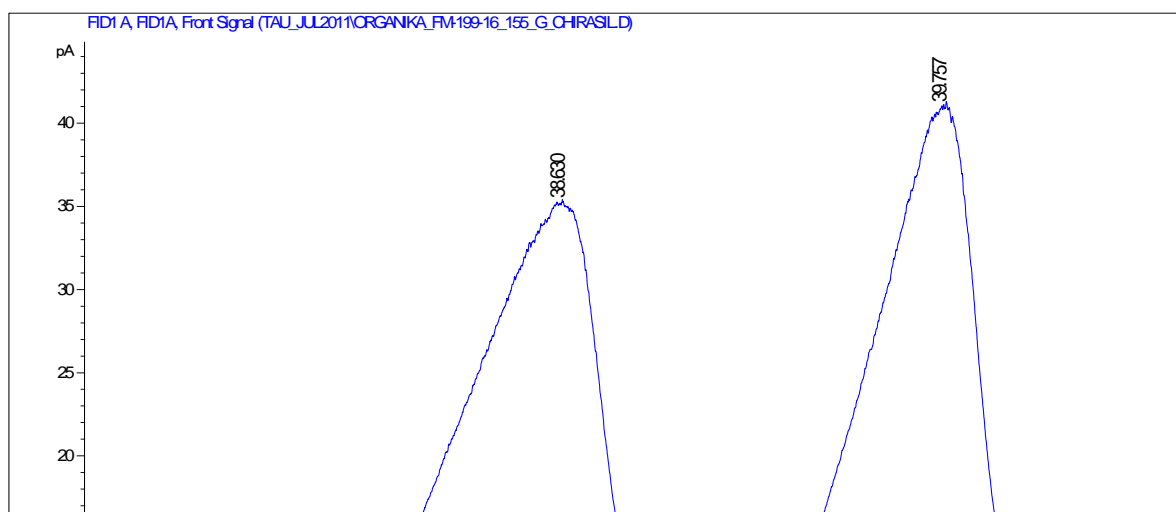
A mixture of ligand (see list of ligands) and $\text{Bi}(\text{OTf})_3 \cdot n\text{H}_2\text{O}$ (59 mg, 0.09 mmol, 0.2 eq) in anhydrous 1,2-dichloroethane (1.35 mL) was stirred in a closed pressure tube at room temperature for 30 min. when 4-methyl-*N*-pent-4-enyl-benzenesulfonamide **1** (107 mg, 0.45 mmol) was added in one portion. Pressure tube was purged with argon and mixture was stirred at room temperature for 24 hrs. The temperature was raised by 20°C every 24 hours if progress in conversion did not occurred as monitored by TLC. After the full conversion of **1**, the reaction mixture was worked up by a standard way and the crude product was analysed by chiral GC.

Conditions 1:

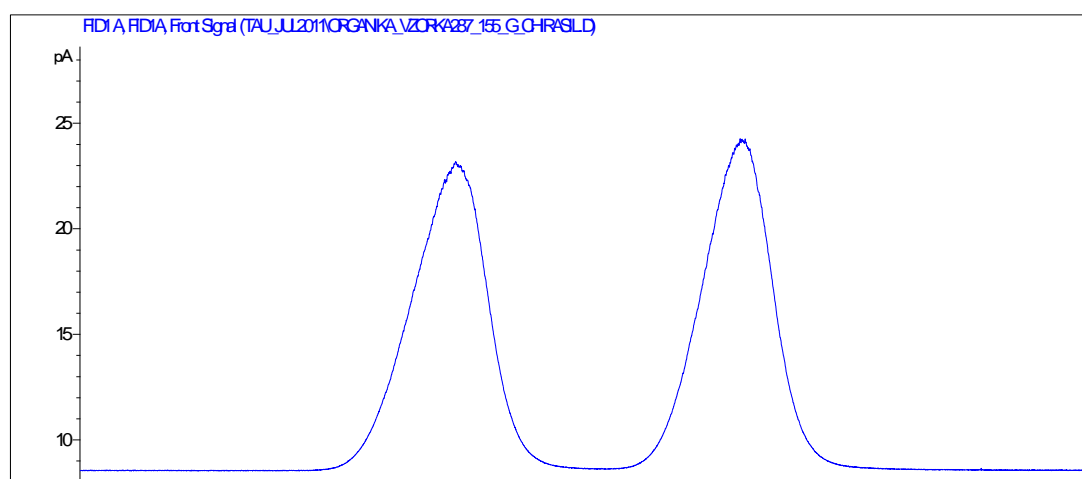
Column G-CHIRASIL-DEX, L=25 m, i.d.=0.25 mm, d.f.=0.25 μm , flow 1 mL/min, Split (1:50), 155°C, izothermic mode.

Standard (racemic mixture of **2**)

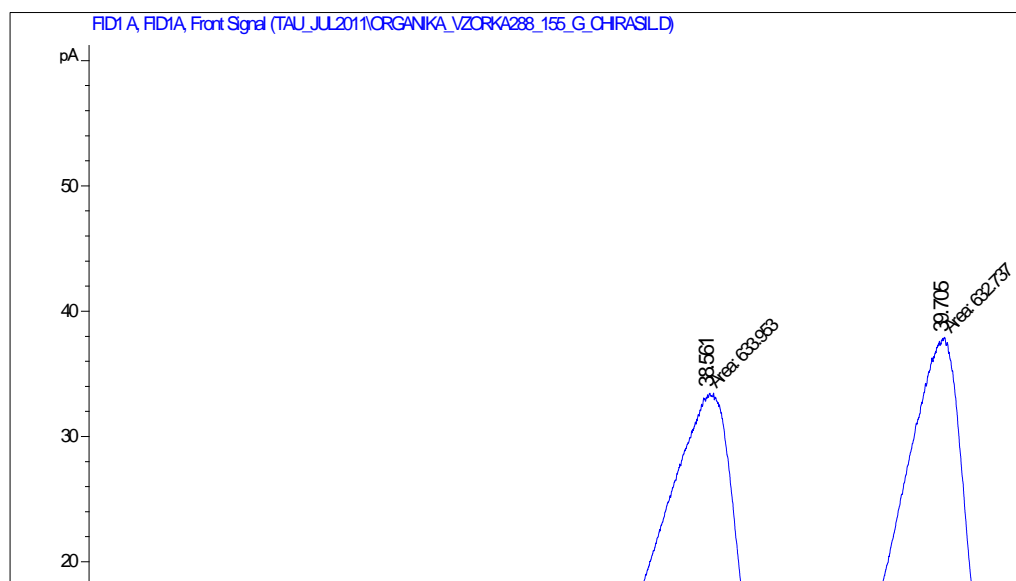
AREA % (49,538 / 50,462)



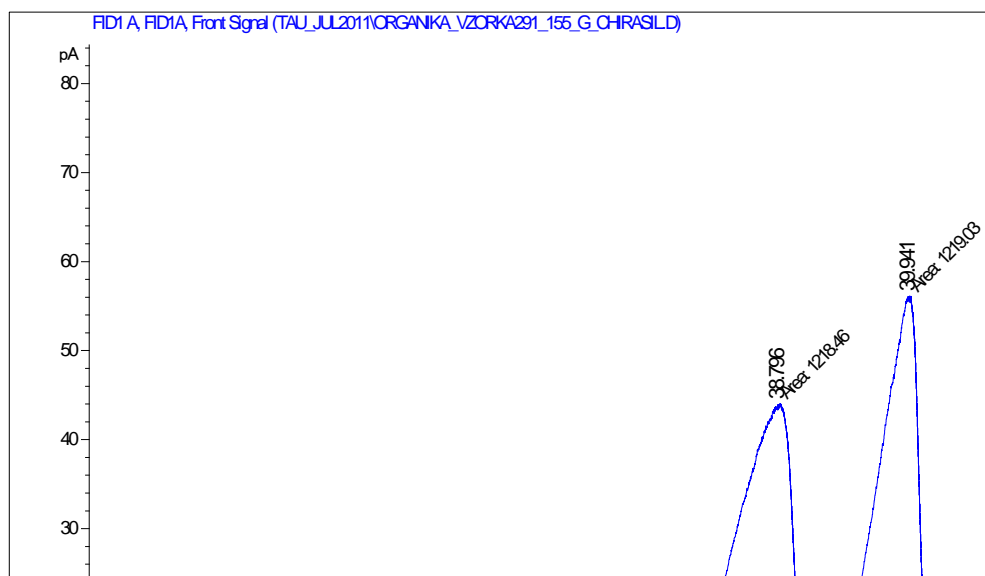
Area % (50,271 / 49,729)



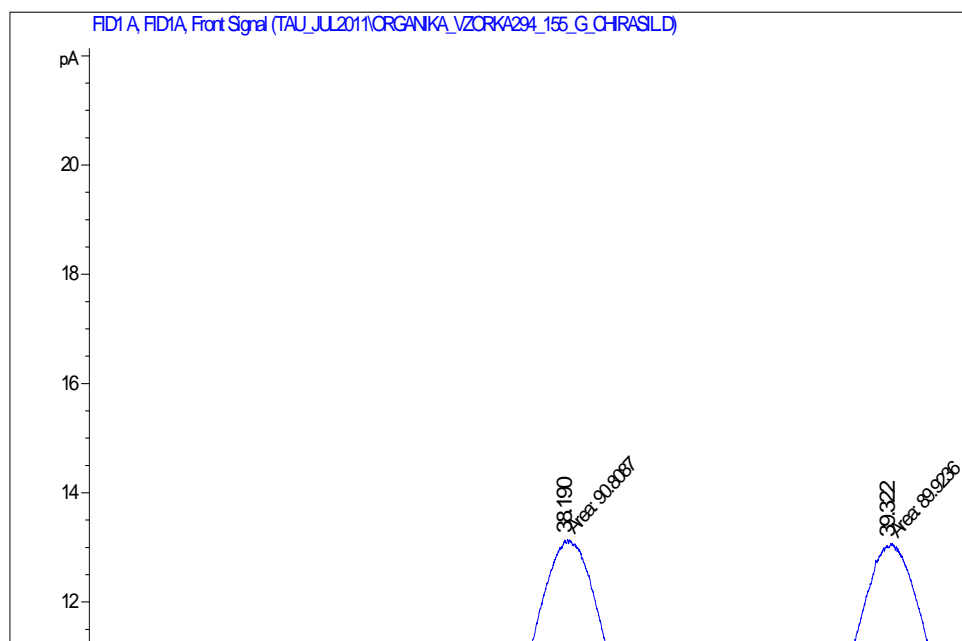
Area % (49,792 / 50,208)



Area % (49,803 / 50,197)



Area % (50,354 / 49,646)

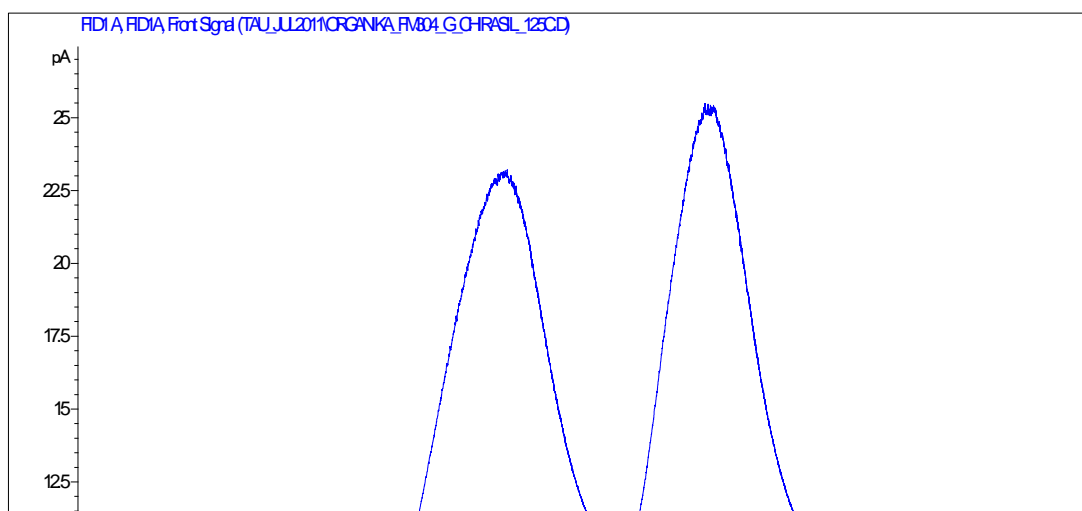


Conditions 2:

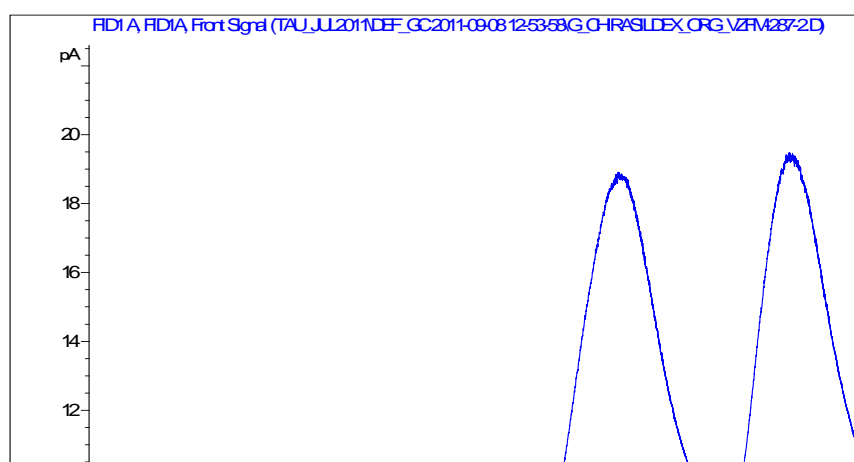
Column G-CHIRASIL-DEX, L=25m, i.d.=0.25 mm, d.f.=0.25 μ m, Flow 2 mL/min, Split (1:50),
125°C Isothermic mode.

Analytical standard (racemic mixture of 2)

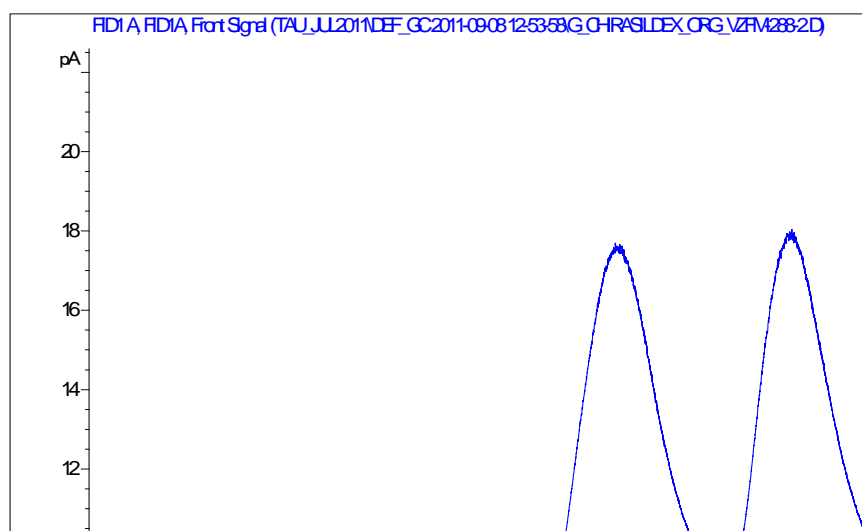
AREA% (49,855 / 50,145)



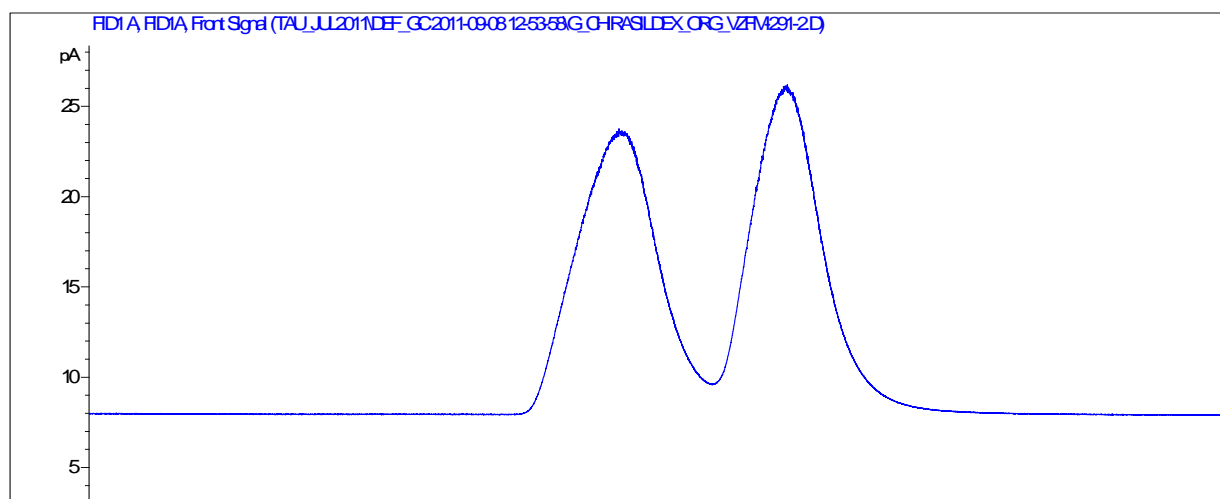
AREA% (50,043 / 49,957)



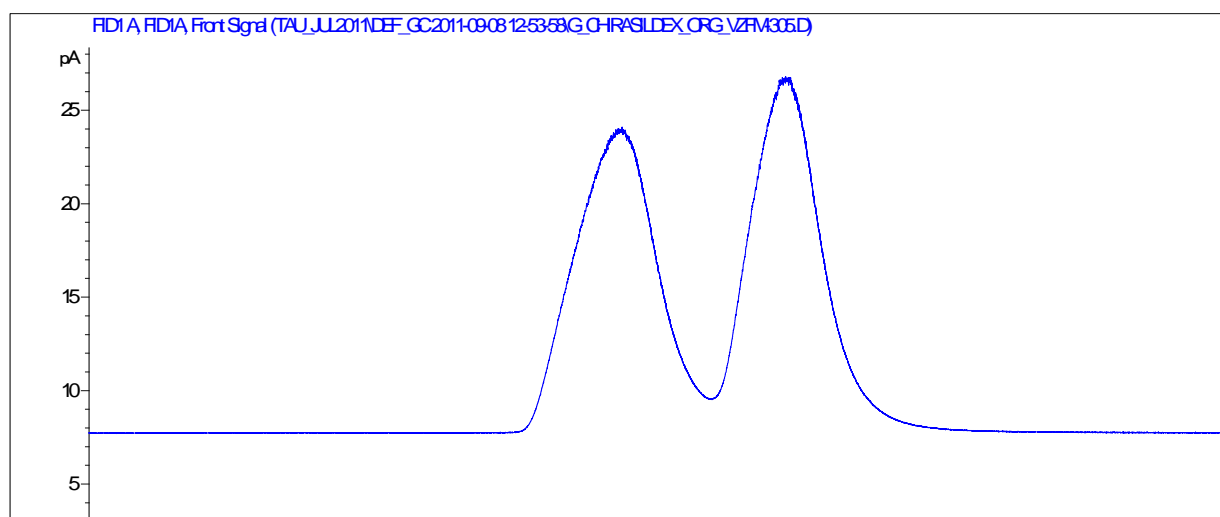
AREA% (50,948 / 49,052)



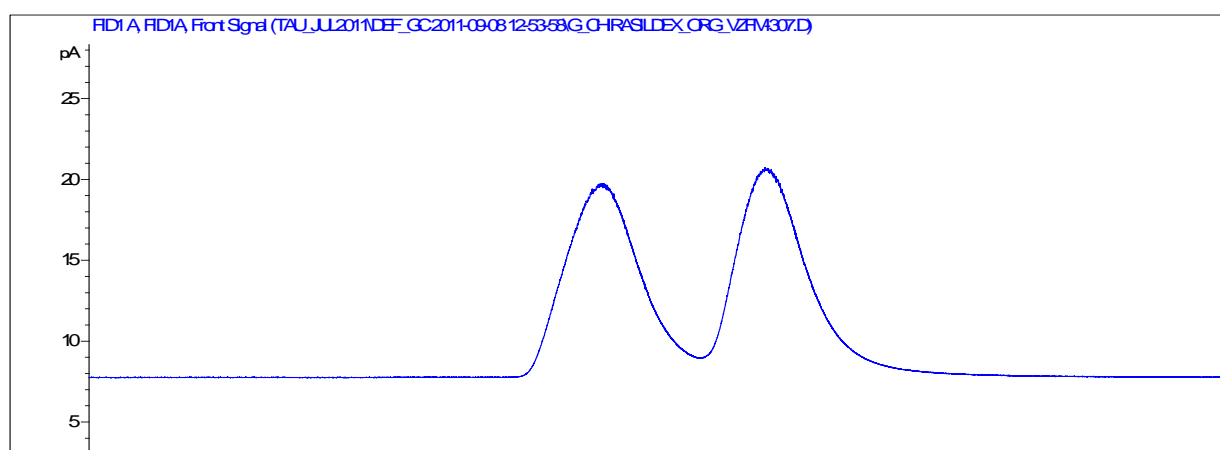
AREA% (50,733 / 49,267)



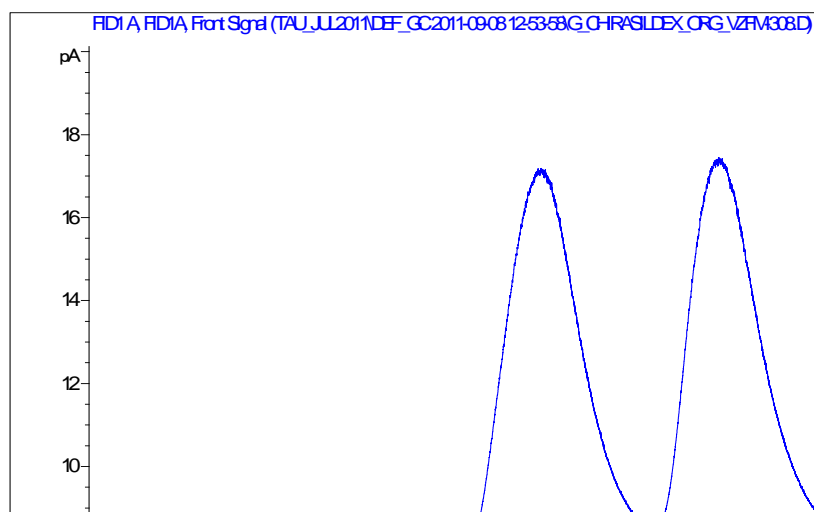
AREA% (50,002 / 49,998)



AREA% (51,459 / 48,541)

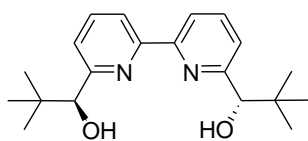


AREA% (50,945 / 49,046)

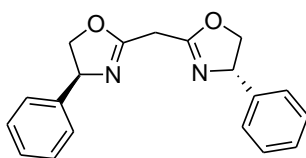


List of chiral ligands

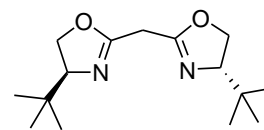
(Those ligands which are not displayed with the respective chromatogram did not afford the full conversion of substrate **1**)



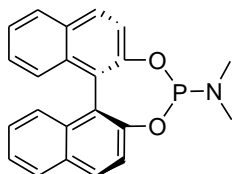
CAS 131726-65-3



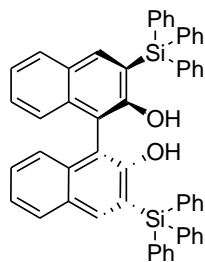
(CAS 132098-59-0)



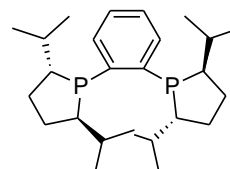
CAS 131833-91-5



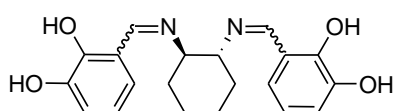
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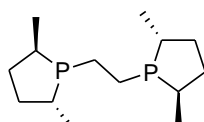
CAS 111822-69-6



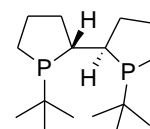
CAS 136705-65-2



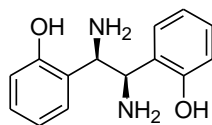
CAS 674285-08-6



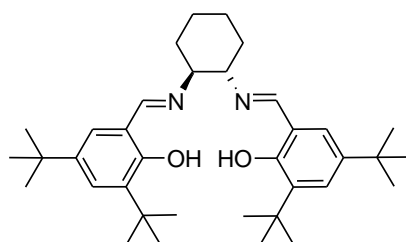
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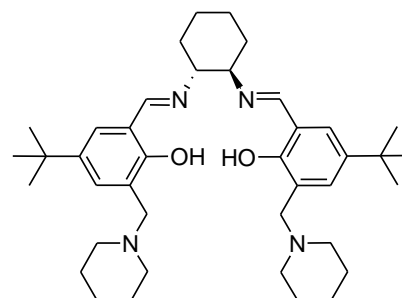
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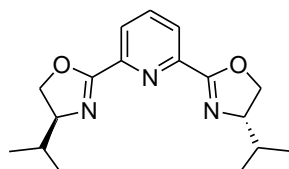
CAS 870991-70-1



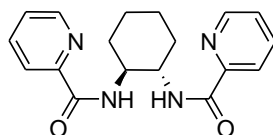
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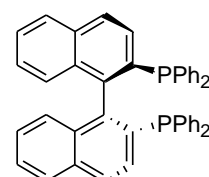
CAS 478282-28-9



CAS 118949-61-4



CAS 172138-95-3



CAS 76189-55-4

(DHQD)₂PHAL
CAS 140853-10-7

(DHQ)₂AQN
CAS 176097-24-8