

Thiourea Catalyzed Organocatalytic Enantioselective Michael Addition of Diphenyl Phosphite to Nitroalkenes

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ELECTRONIC SUPPLEMENTARY INFORMATION (ESI)

General experimental methods. Purification of reaction products was carried out by flash chromatography using silical-gel (0.040-0.063 mm). Analytical thin layer chromatography was performed on 0.25 mm silical gel 60-F plates. ¹H-NMR spectra were recorded at 400 MHz; ¹³C-NMR spectra were recorded at 100 MHz and 75 MHz; CDCl₃ as the solvent. Chemical shifts were reported in the δ scale relative to residual CHCl₃ (7.26 ppm) for ¹H-NMR and to the central line of CDCl₃ (77 ppm) for ¹³C-NMR.

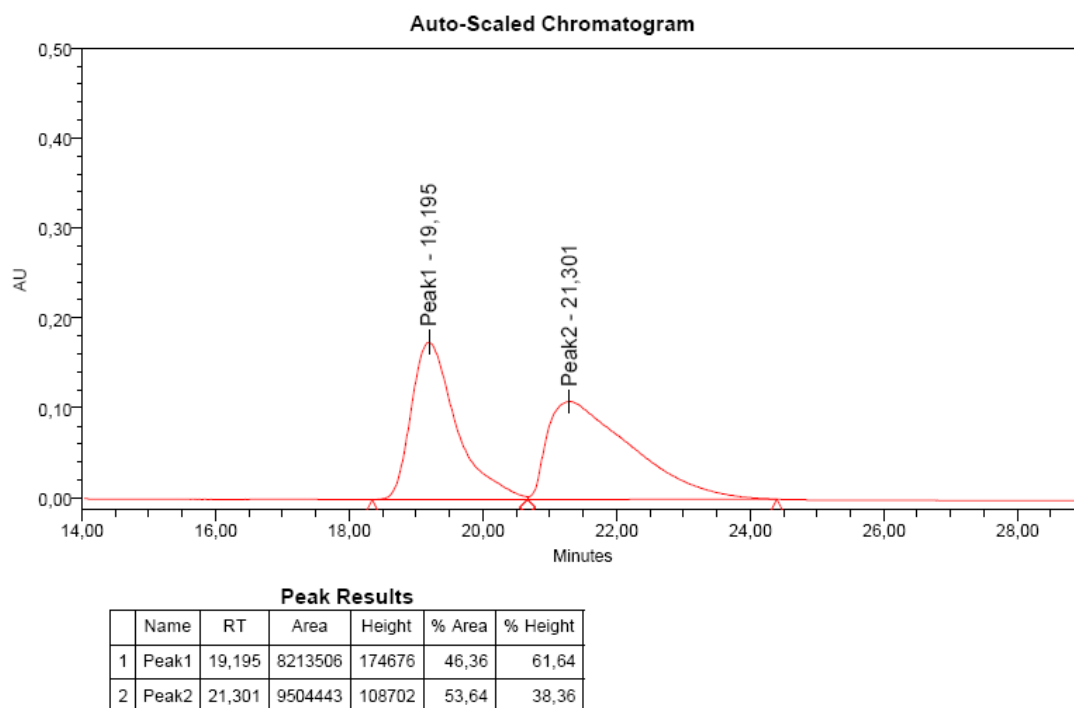


Figure S1. Racemic mixture of **7a**. Daicel Chiralpak IA column (*n*-hexane/*i*-PrOH = 60:40, flow rate 0.5 mL/min)

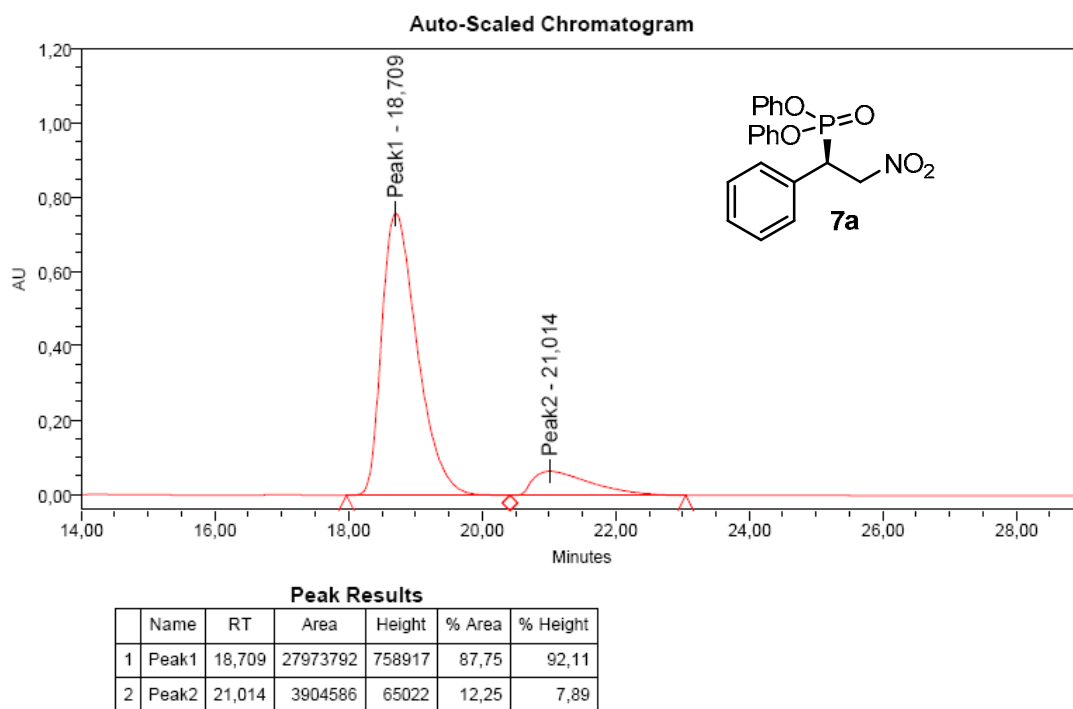


Figure S2. Chiral sample of (*R*)-diphenyl 2-nitro-1-phenylethylphosphonate (**7a**)

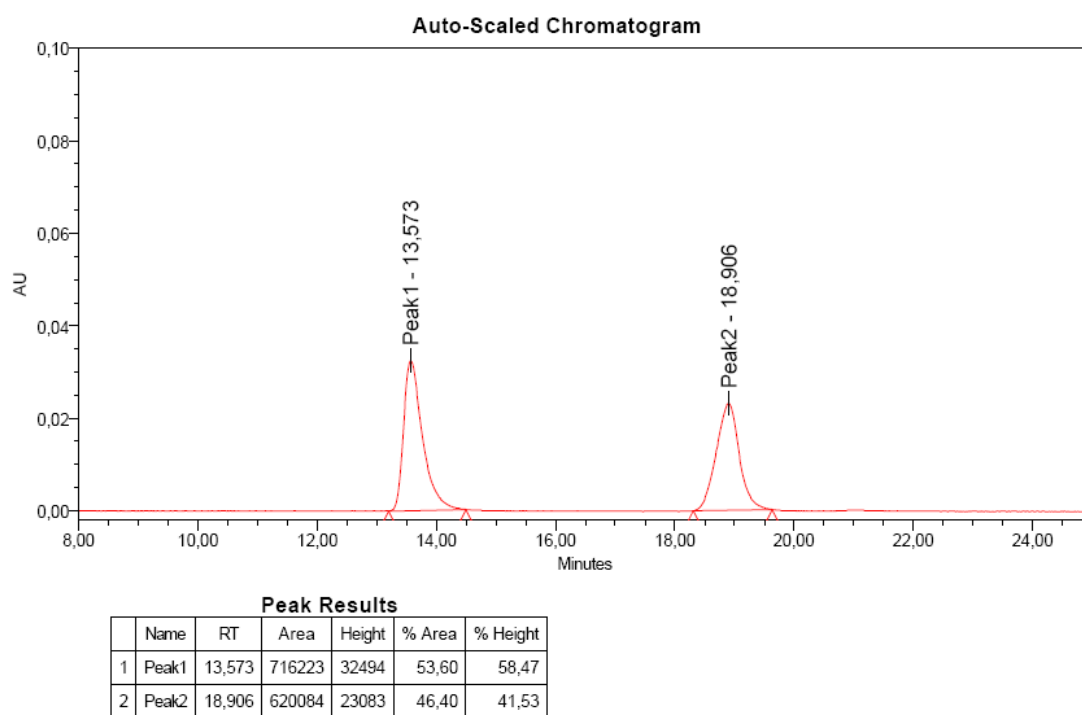


Figure S3. Racemic mixture of **7b**. Daicel Chiralpak IB column (*n*-hexane/*i*-PrOH = 90:10, flow rate 1 mL/min)

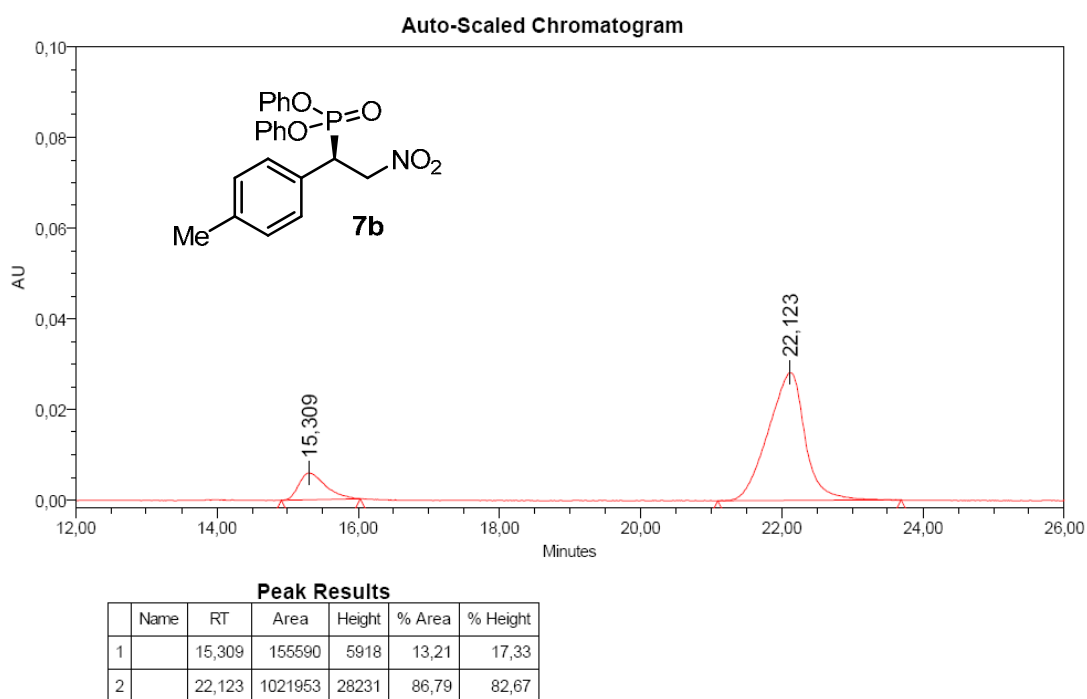


Figure S4. Chiral sample of (*R*)-diphenyl 2-nitro-1-*p*-tolylethylphosphonate (**7b**)

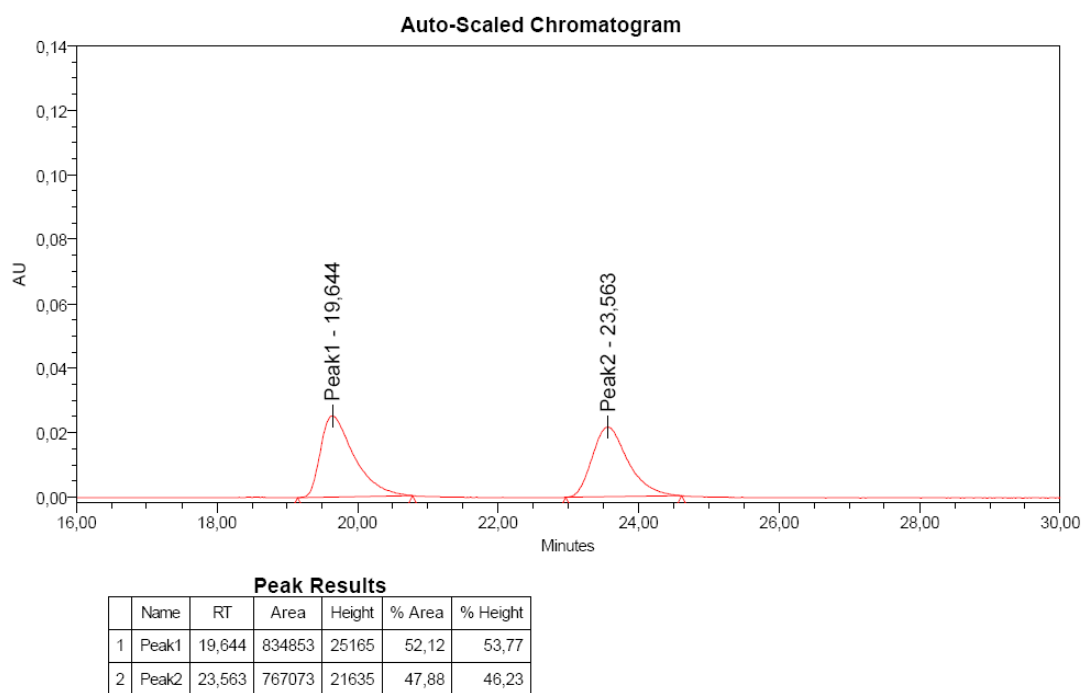


Figure S5. Racemic mixture of **7c**. Daicel Chiralpak IB column (*n*-hexane/*i*-PrOH = 90:10, flow rate 1 mL/min)

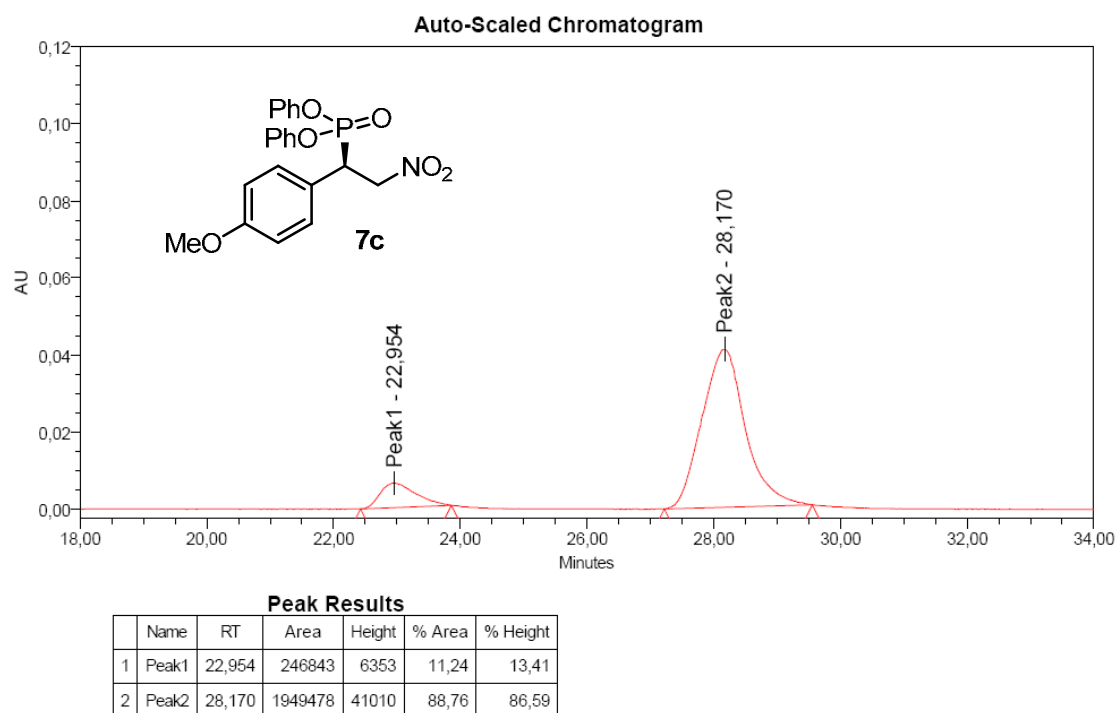


Figure S6. Chiral sample of (*R*)-diphenyl 1-(4-methoxyphenyl)-2-nitroethylphosphonate (**7c**)

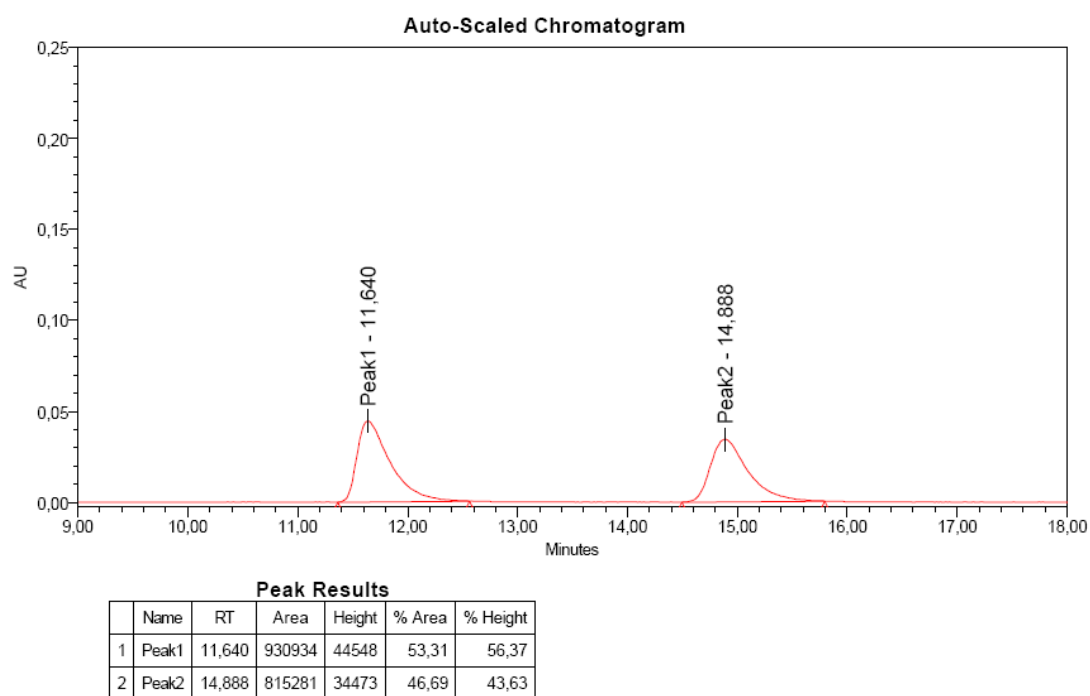


Figure S7. Racemic mixture of **7d**. Daicel Chiralpak IB column (*n*-hexane/*i*-PrOH = 90:10, flow rate 1 mL/min)

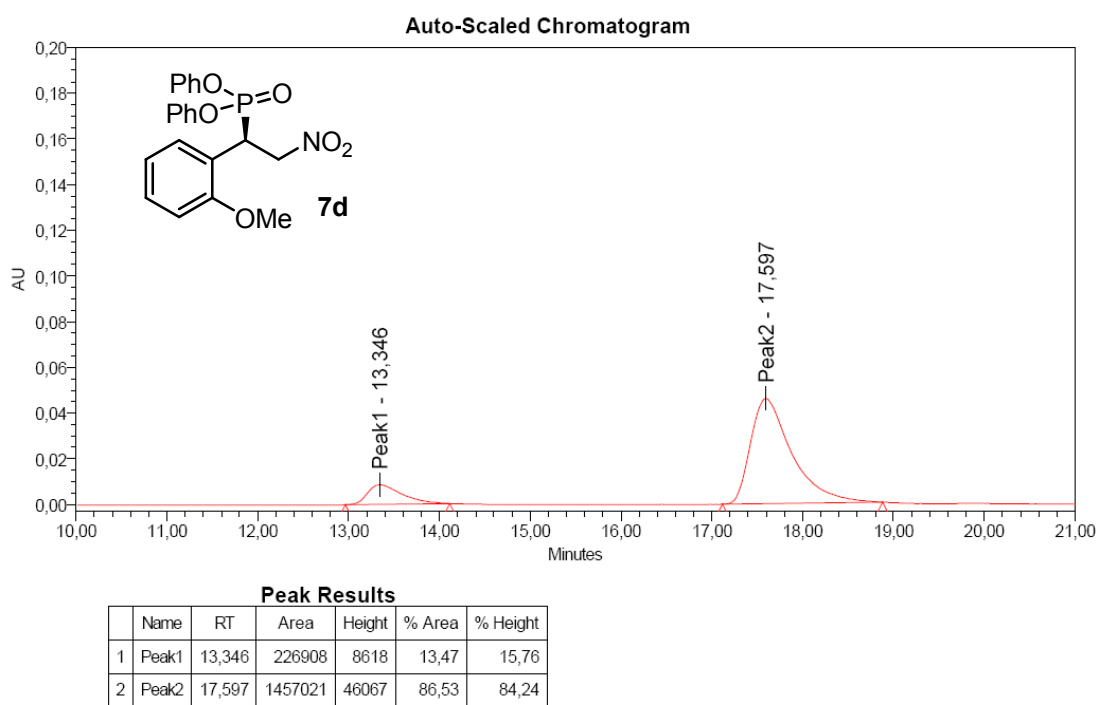


Figure S8. Chiral sample of (*R*)-diphenyl 1-(2-methoxyphenyl)-2-nitroethylphosphonate (**7d**)

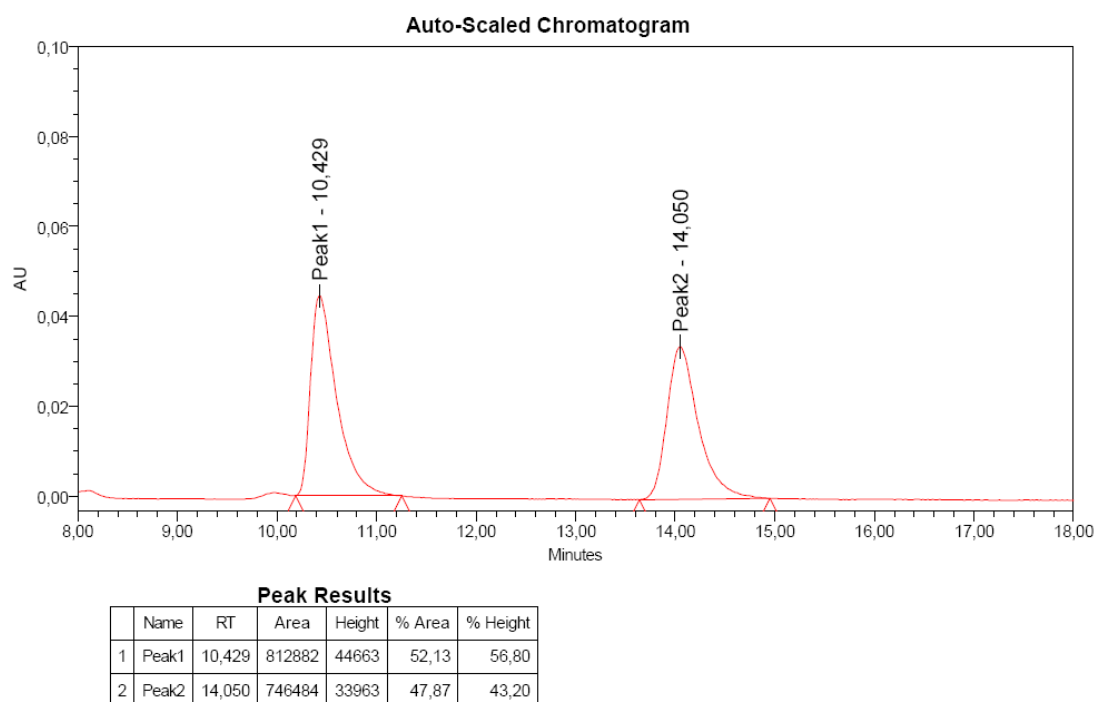


Figure S9. Racemic mixture of **7e**. Daicel Chiralpak IB column (*n*-hexane/*i*-PrOH = 90:10, flow rate 1 mL/min)

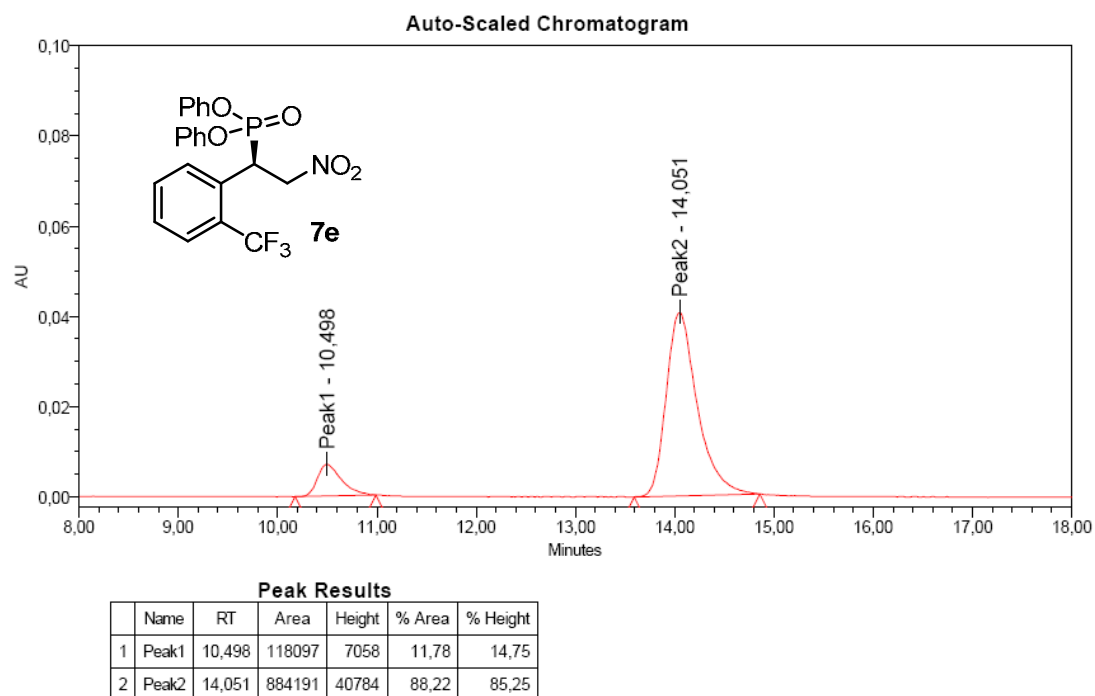


Figure S10. Chiral sample of (*R*)-diphenyl 2-nitro-1-(2-trifluoromethylphenyl)ethylphosphonate (**7e**)

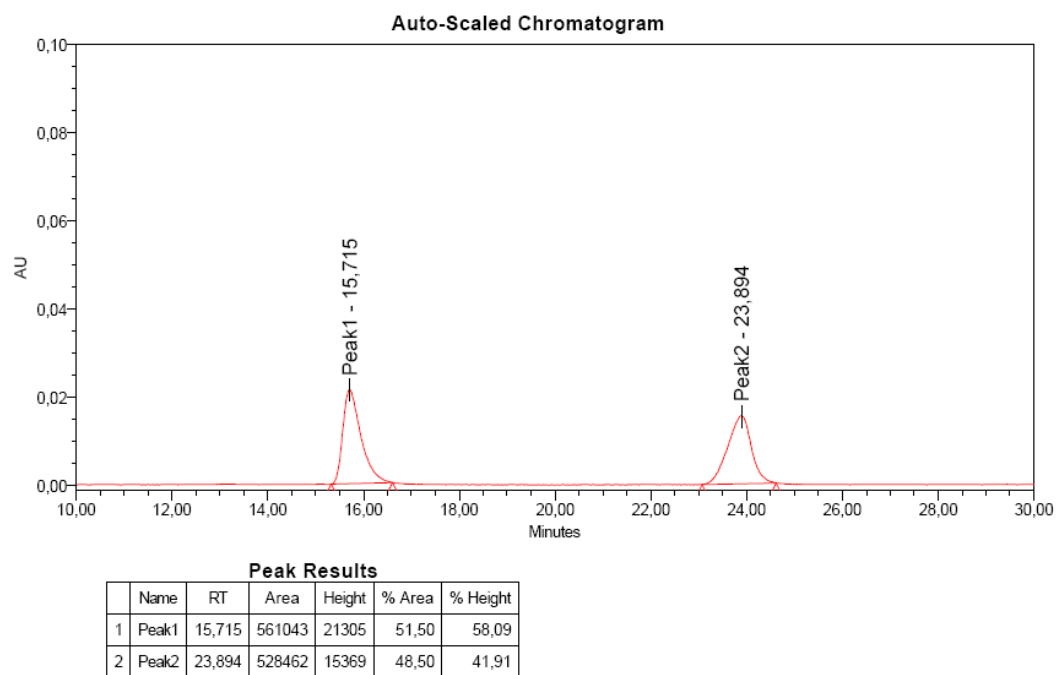


Figure S11. Racemic mixture of **7f**. Daicel Chiralpak IB column (*n*-hexane/*i*-PrOH = 90:10, flow rate 1 mL/min)

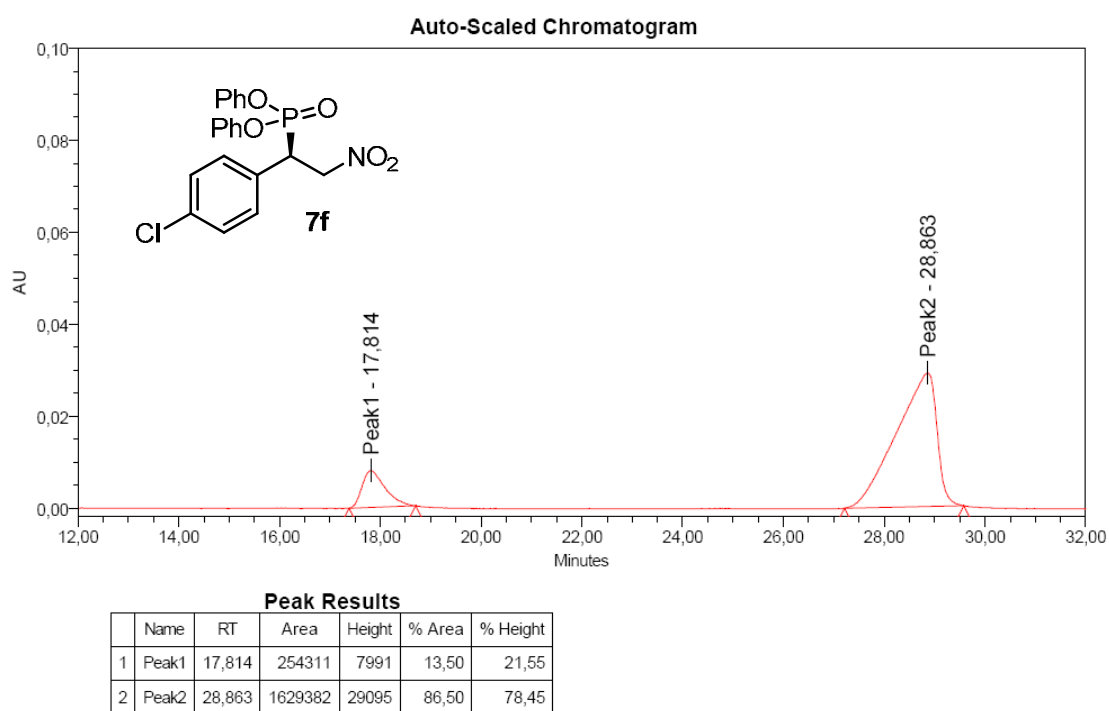


Figure S12. Chiral sample of (*R*)-diphenyl 1-(4-chlorophenyl)-2-nitroethylphosphonate (**7f**)

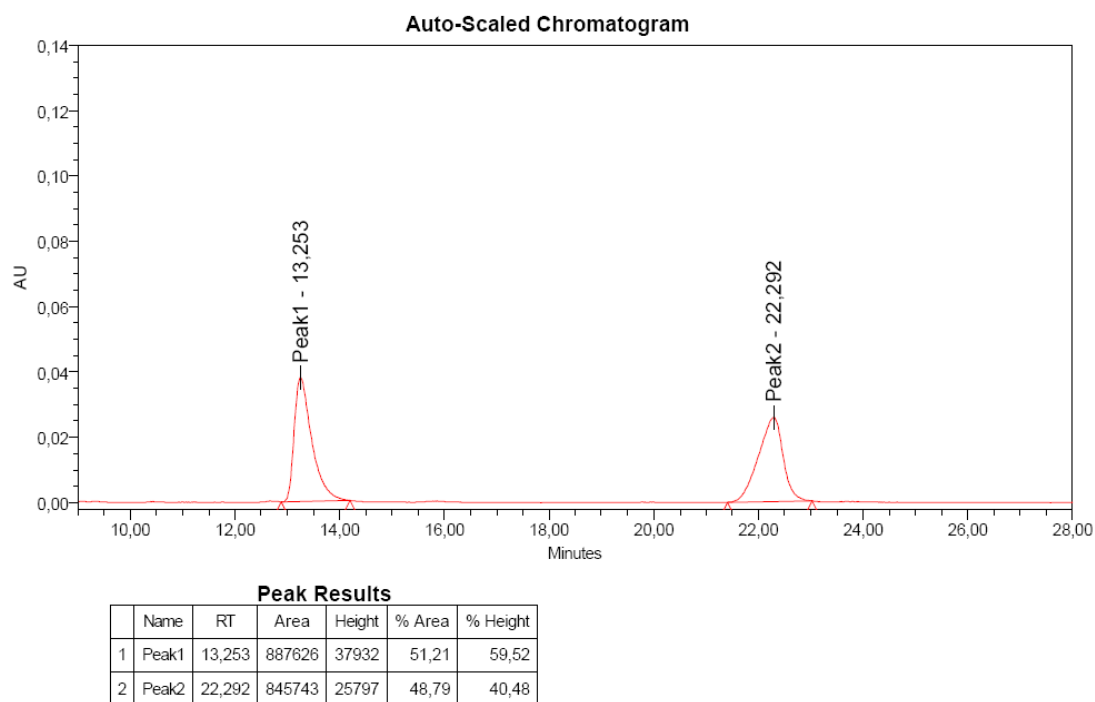


Figure S13. Racemic mixture of **7g**. Daicel Chiralpak IB column (*n*-hexane/*i*-PrOH = 90:10, flow rate 1 mL/min)

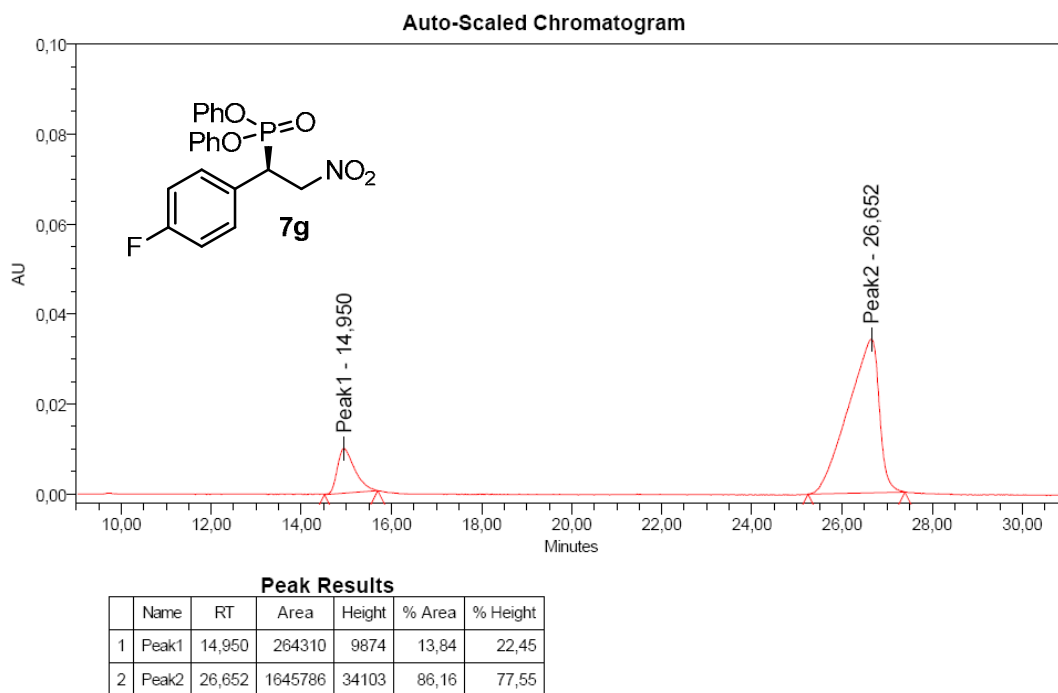


Figure S14. Chiral sample of (*R*)-diphenyl 1-(4-fluorophenyl)-2-nitroethylphosphonate (**7g**)

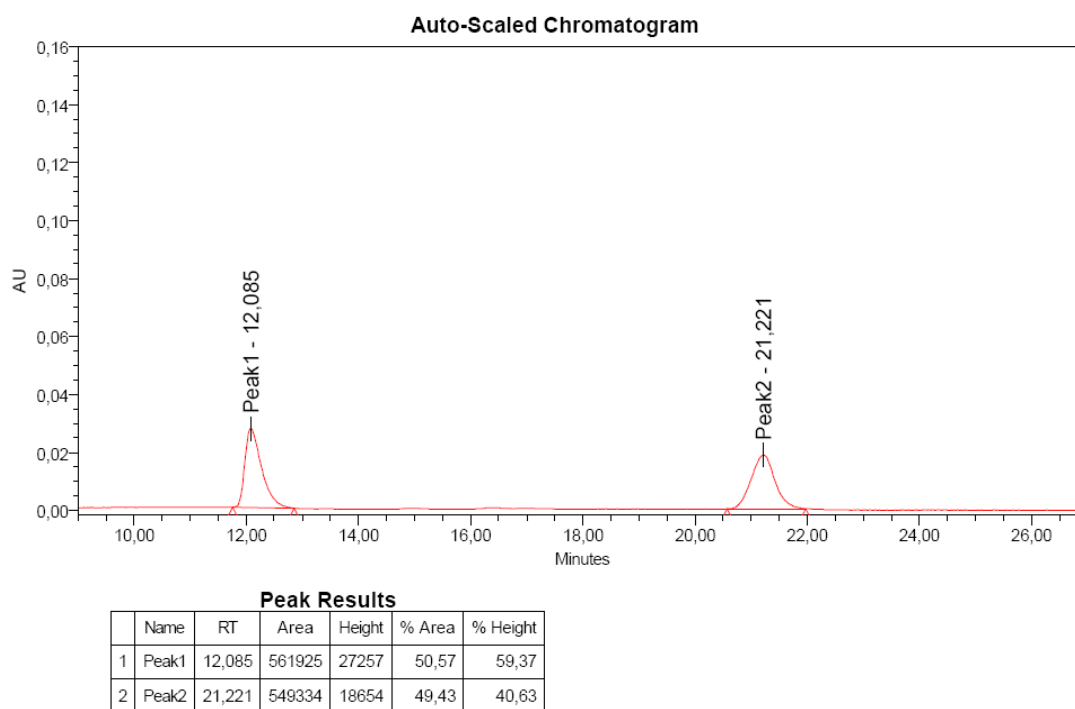


Figure S15. Racemic mixture of **7h**. Daicel Chiralpak IB column (*n*-hexane/*i*-PrOH = 90:10, flow rate 1 mL/min)

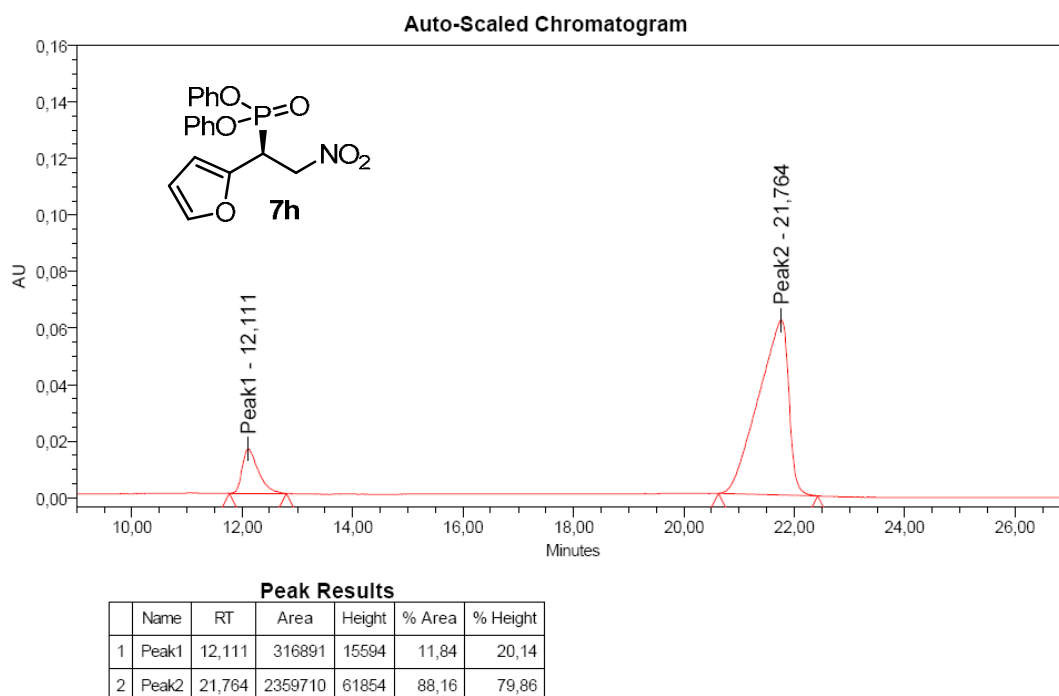


Figure S16. Chiral sample of (*S*)-diphenyl 1-(furan-2-yl)-2-nitroethylphosphonate (**7h**)

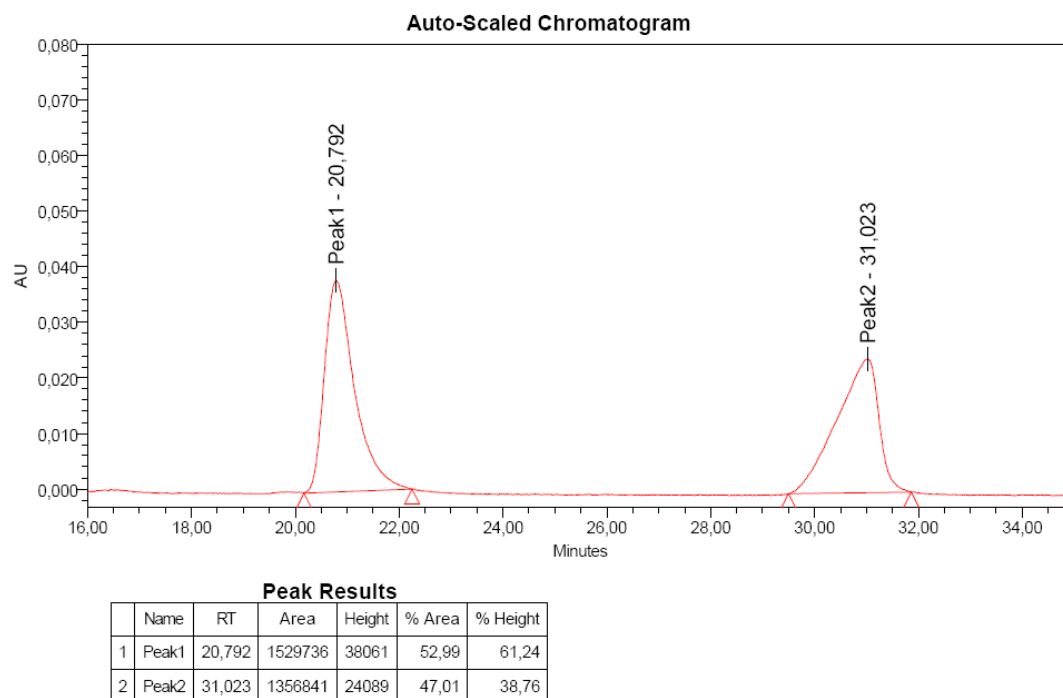


Figure S17. Racemic mixture of **7i**. Daicel Chiralpak IB column (*n*-hexane/*i*-PrOH = 90:10, flow rate 1 mL/min)

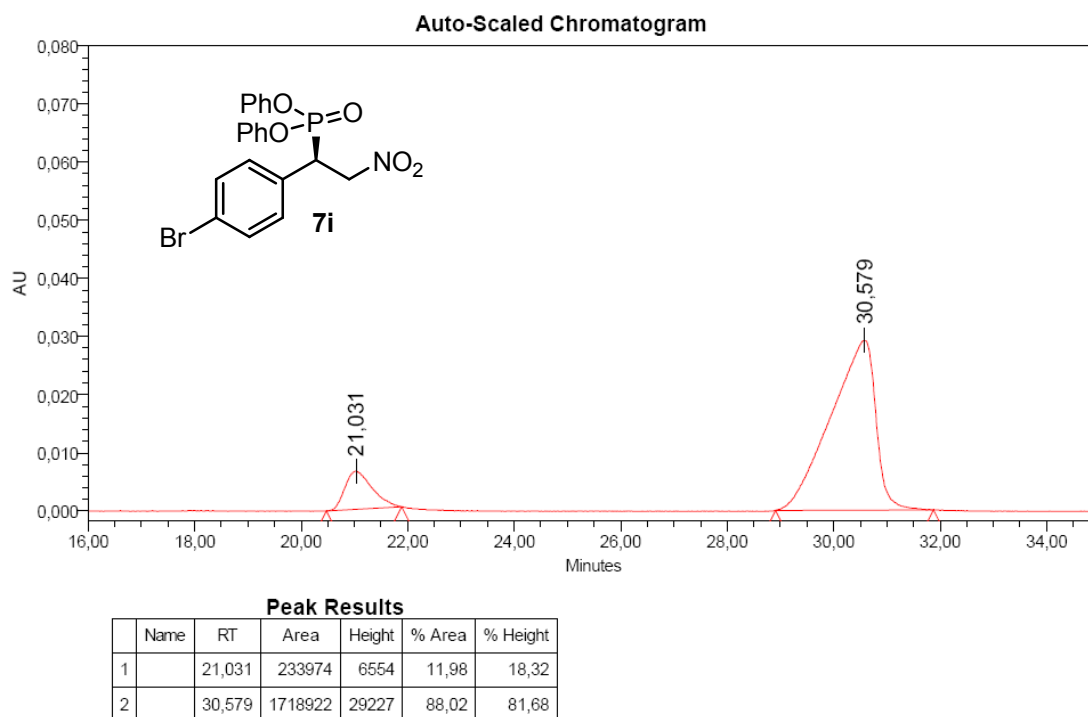


Figure S18. Chiral sample of (*R*)-diphenyl 1-(4-bromophenyl)-2-nitroethylphosphonate (**7i**)

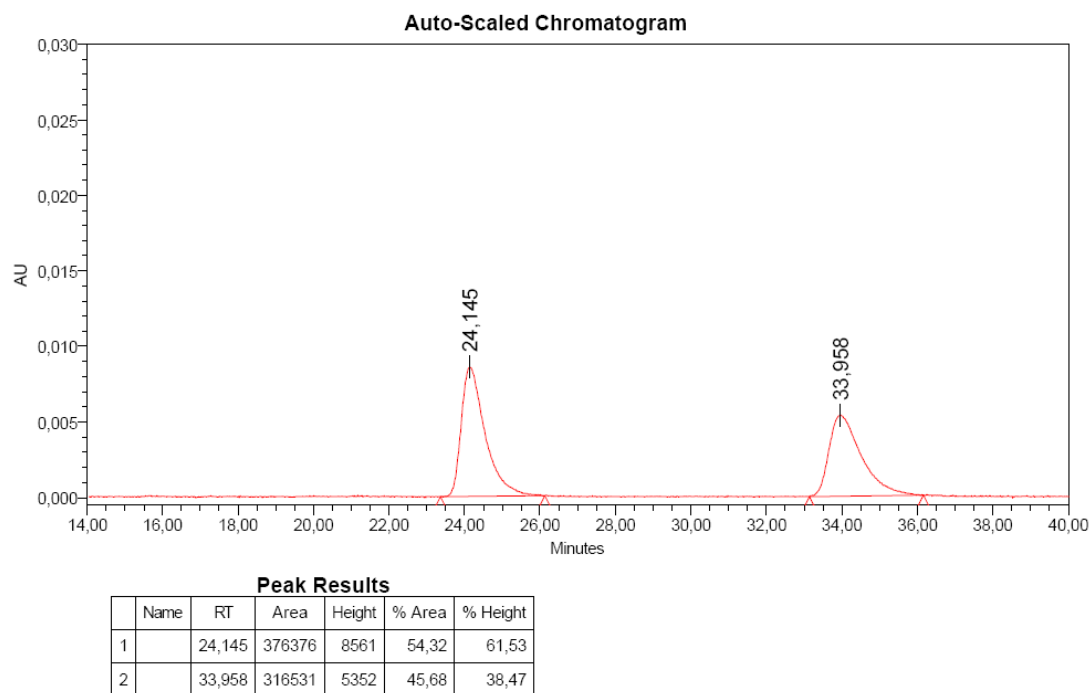


Figure S19. Racemic mixture of **7j**. Daicel Chiralpak IB column (*n*-hexane/*i*-PrOH = 90:10, flow rate 1 mL/min)

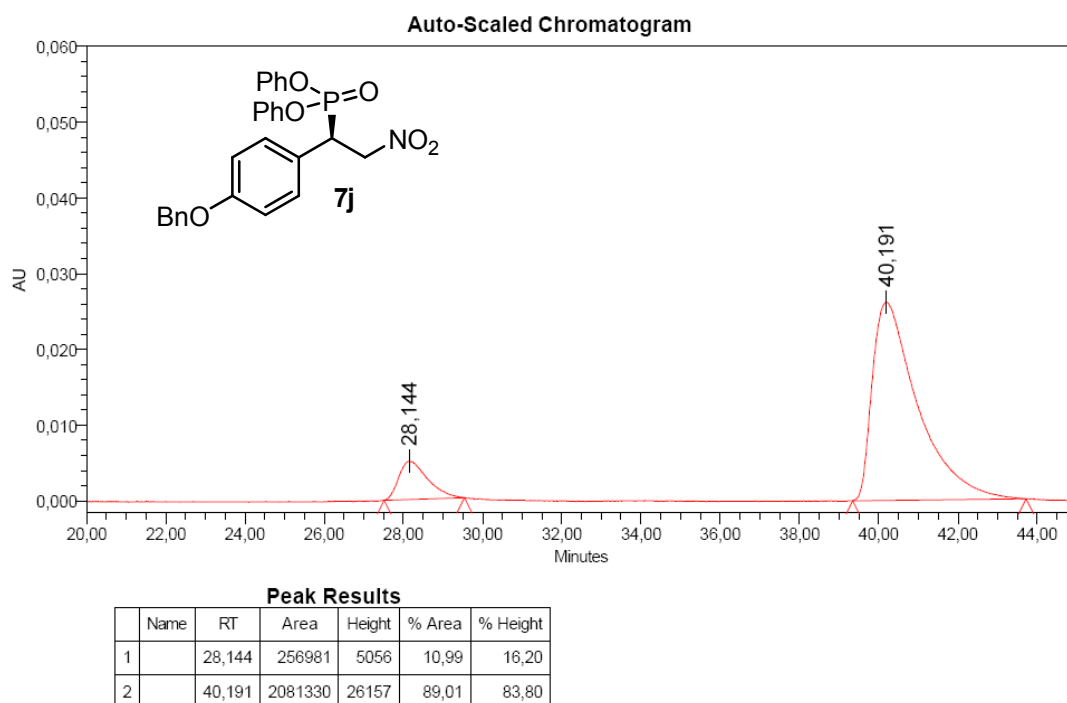


Figure S20. Chiral sample of (*R*)-diphenyl 1-(4-(benzyloxy)phenyl)-2-nitroethylphosphonate (**7j**)

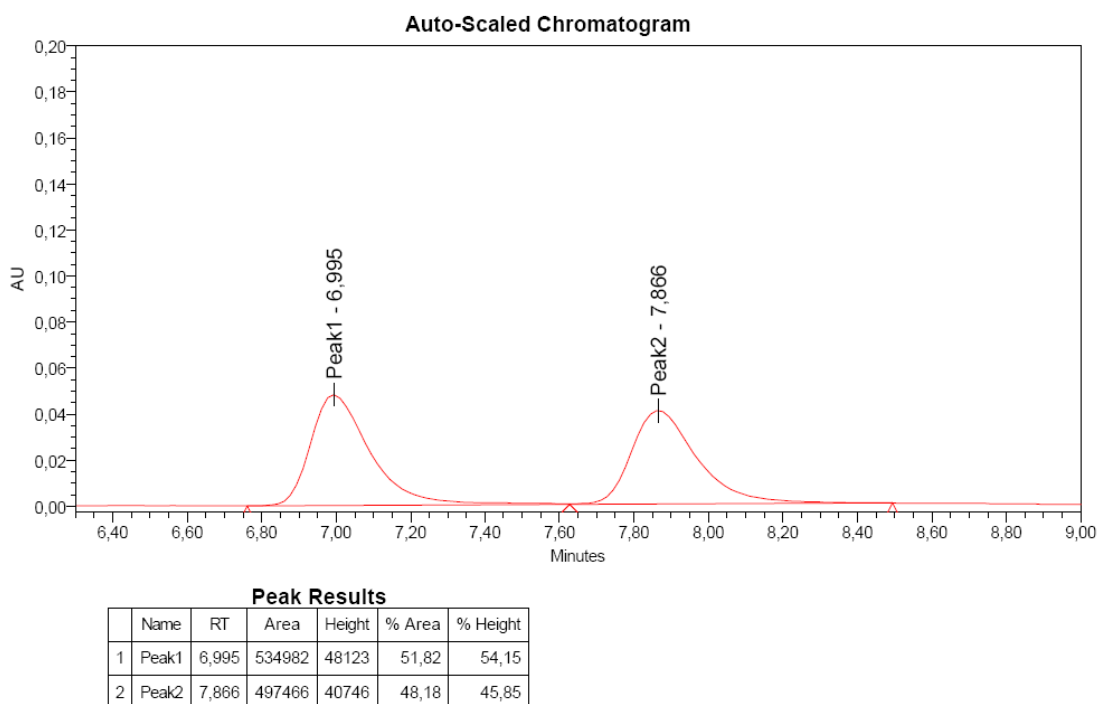


Figure S21. Racemic mixture of **7k**. Daicel Chiralpak IB column (*n*-hexane/*i*-PrOH = 90:10, flow rate 1 mL/min)

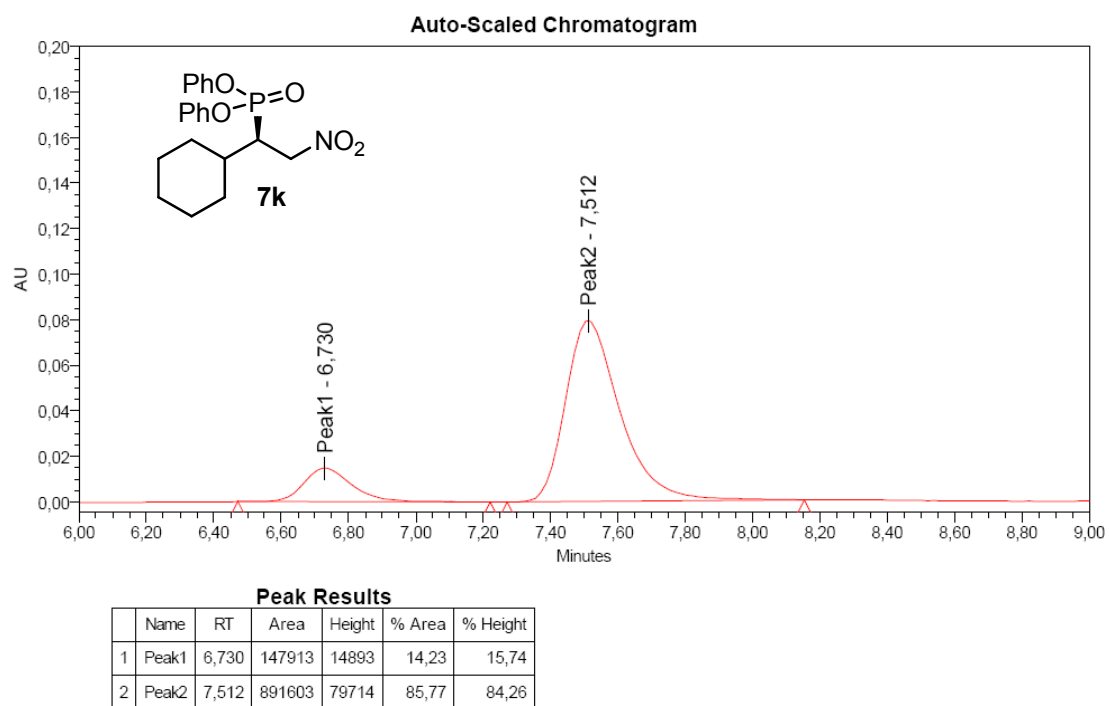


Figure S22. Chiral sample of (*R*)-diphenyl 1-cyclohexyl-2-nitroethylphosphonate (**7k**)

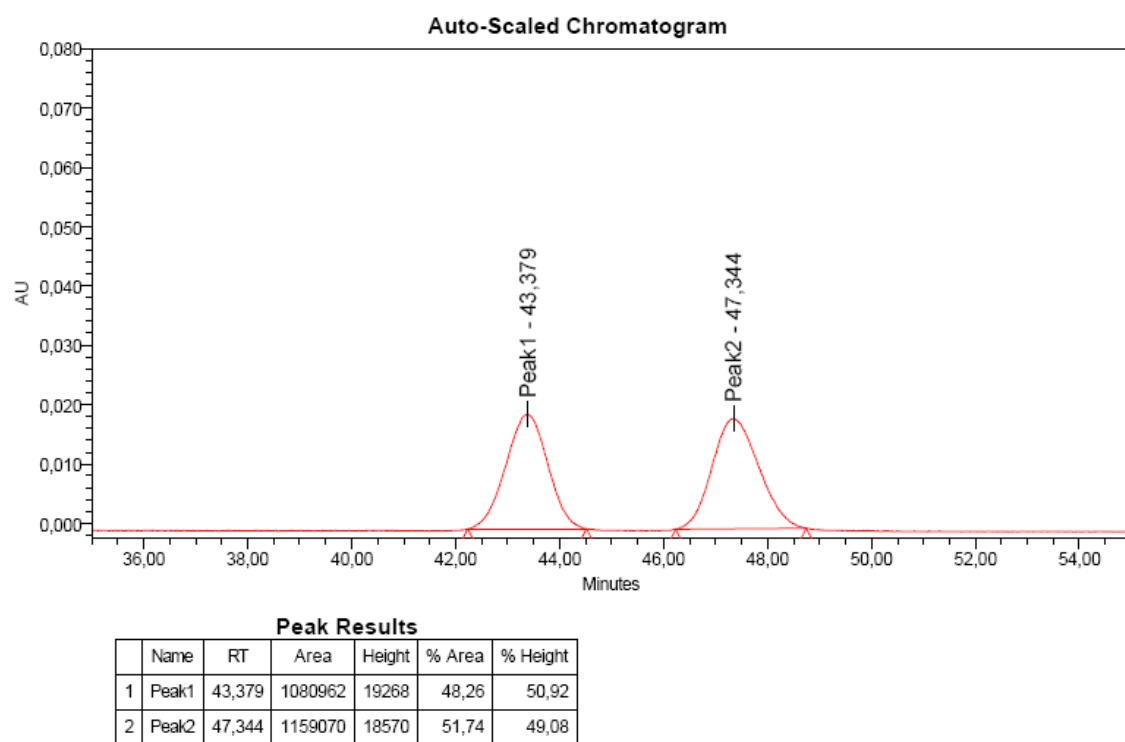


Figure S23. Racemic mixture of **7I**. Daicel Chiralpak IA column (*n*-hexane/*i*-PrOH = 95:5, flow rate 1 mL/min)

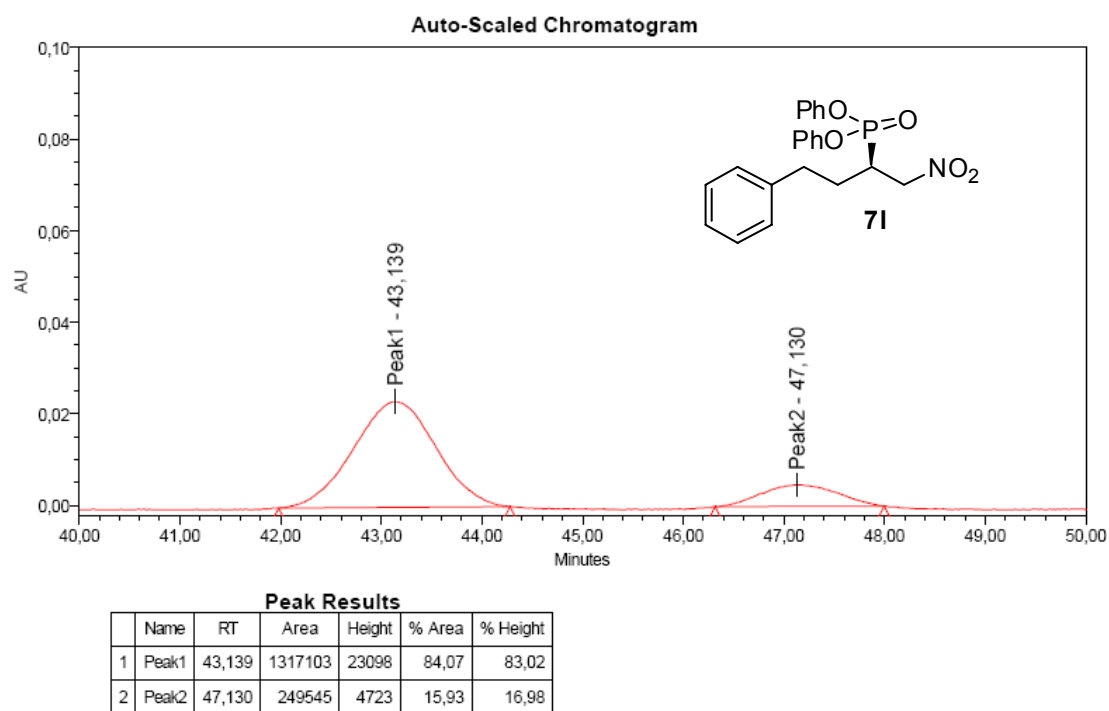
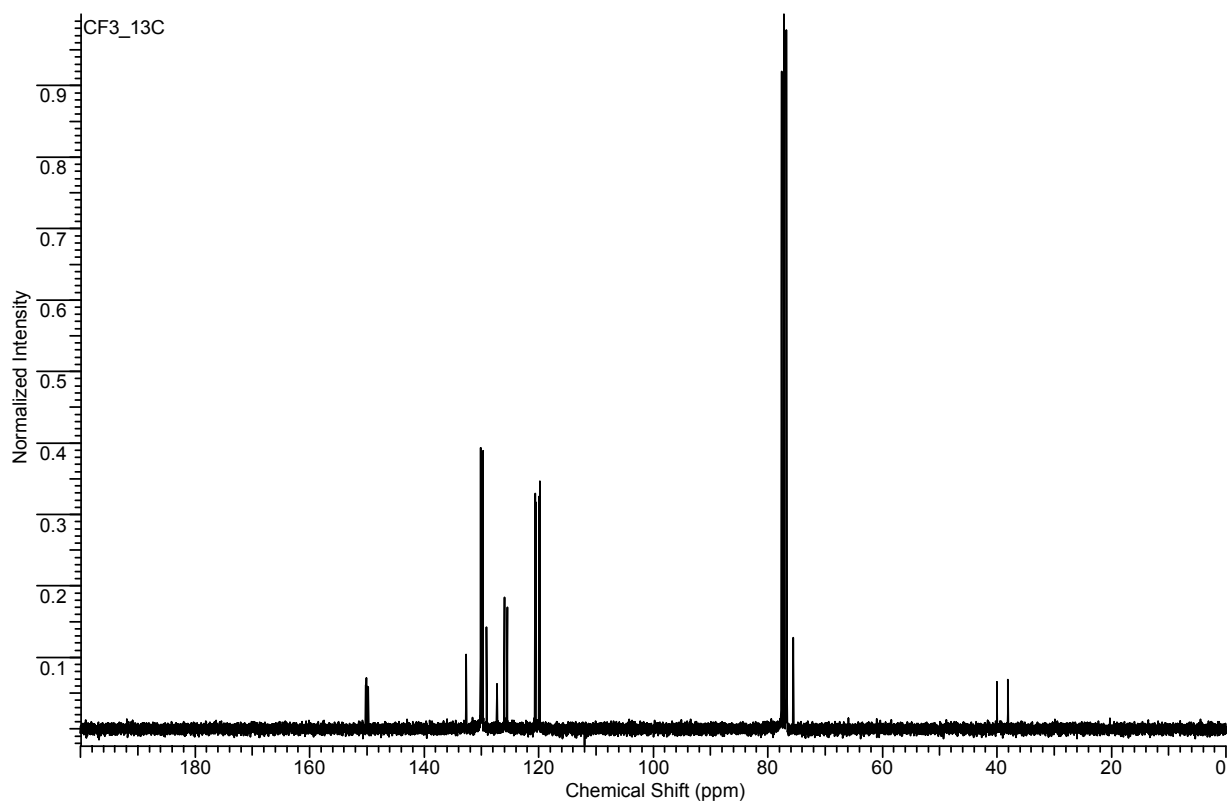
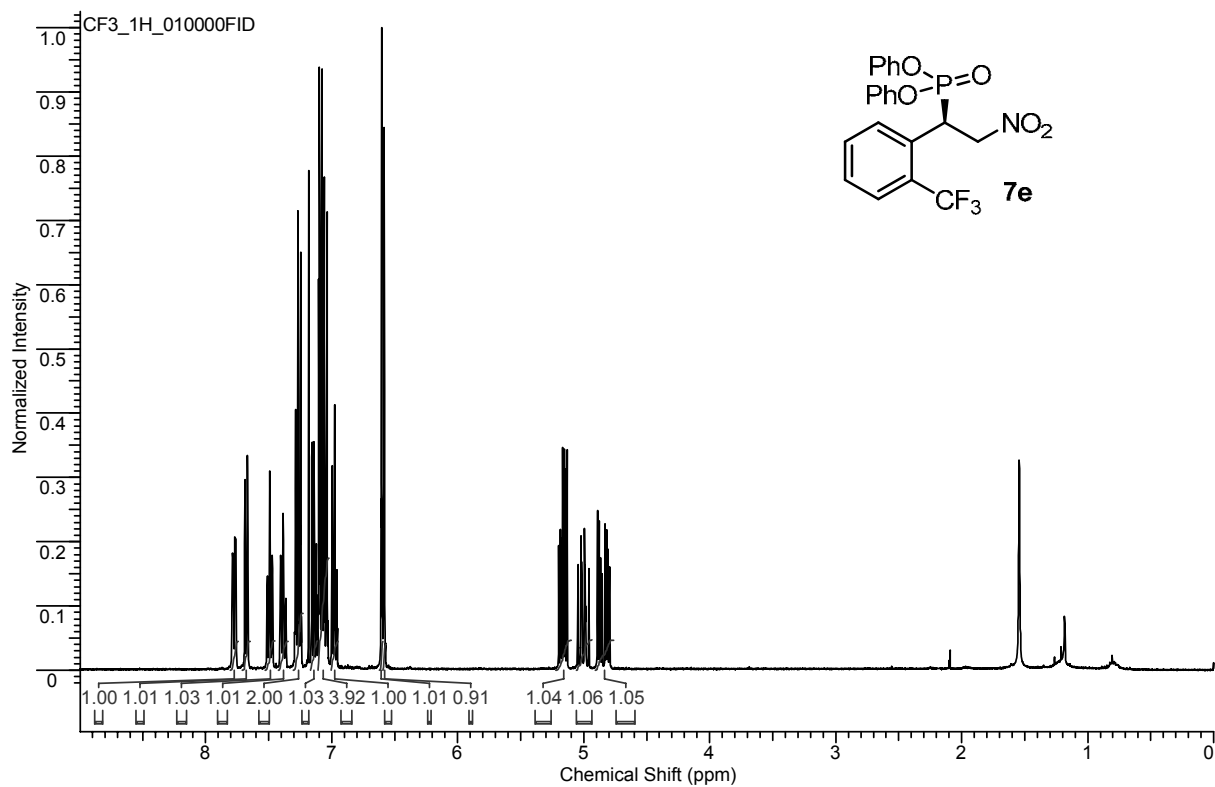


Figure S24. Chiral sample of (*R*)-Diphenyl 1-nitro-4-phenylbutan-2-ylphosphonate (**7I**)

(R)-Diphenyl 2-nitro-1-(2-trifluoromethyl)phenyl)ethylphosphonate (7e)



(R)-Diphenyl 1-(4-(benzyloxy)phenyl)-2-nitroethylphosphonate (7j)

