

Supplementary information

Photochemical asymmetric synthesis of phenyl-bearing quaternary chiral carbons using chiral-memory effect on β -hydrogen abstraction by thiocarbonyl group

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X-Ray crystal data for (R)-1a, (S)-1e, (R)-2a, (R)-2b, and (R)-2d

Crystal data: for (R)-1a (recrystallized from a mixture of CHCl_3 and hexane); $\text{C}_{22}\text{H}_{19}\text{NOS}$, $M_r = 345.44$, orthorhombic, space group $P2_12_12_1$, $a = 6.126(3) \text{ \AA}$, $b = 9.050(4) \text{ \AA}$, $c = 32.991(11) \text{ \AA}$, $V = 1829.0(13) \text{ \AA}^3$, $Z = 4$, $\rho = 1.255 \text{ Mgm}^{-3}$; in the final least-square refinement cycles on F^2 , the model converged an $R1 = 0.0440$, $wR2 = 0.1187$ for 2052 reflections. Absolute structure parameter $-0.02(4)$. CCDC 611153.

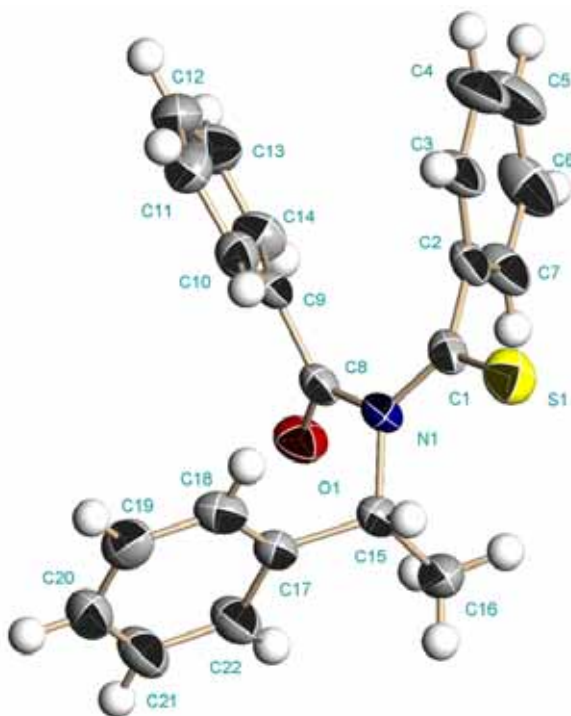


Fig. S1 View of 1a showing the atoms and thermal ellipsoids at 40% probability.

Crystal data: for (*S*)-**1e** (recrystallized from a mixture of CHCl₃ and hexane); C₂₀H₂₁NO₃S, *Mr* = 355.44, monoclinic, space group *P*2₁, *a* = 7.7525(8) Å, *b* = 12.0713(13) Å, *c* = 9.9335(10) Å, β = 97.9140(10)°, *V* = 920.70(17) Å³, *Z* = 2, ρ = 1.289 Mg m⁻³; in the final least-square refinement cycles on *F*², the model converged an *R*₁ = 0.0286, *wR*₂ = 0.0759 for 3462 reflections. Absolute structure parameter 0.03(6). CCDC 611154.

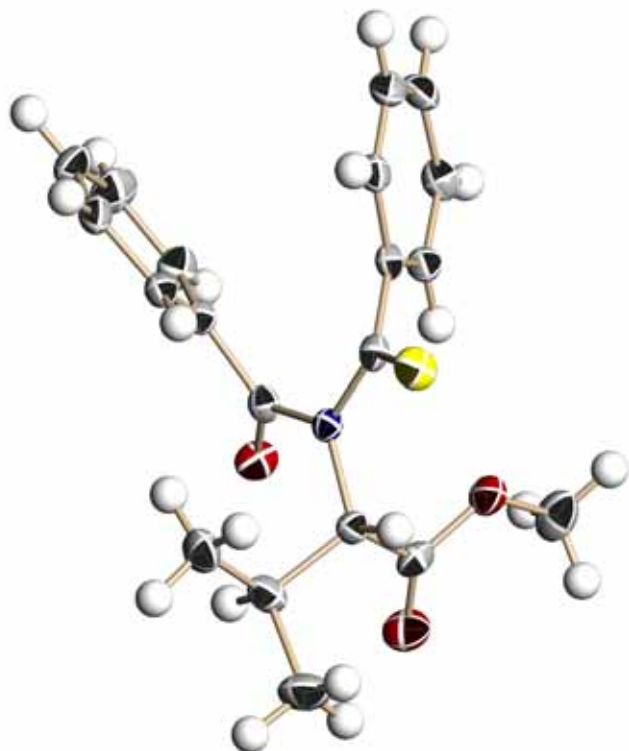


Fig. S2 View of **1e** showing the atoms and thermal ellipsoids at 40% probability.

Crystal data: for (*R*)-**2a** (recrystallized from a mixture of CHCl₃ and hexane); C₂₂H₁₉NOS, *Mr* = 345.44, orthorhombic, space group *P*2₁2₁2₁, *a* = 9.857(3) Å, *b* = 11.082(3) Å, *c* = 17.126(5) Å, *V* = 1870.8(9) Å³, *Z* = 4, ρ = 1.266 Mg m⁻³; in the final least-square refinement cycles on *F*², the model converged an *R*₁ = 0.0612, *wR*₂ = 0.1447 for 3956 reflections. Absolute structure parameter 0.08(3). CCDC 611155.

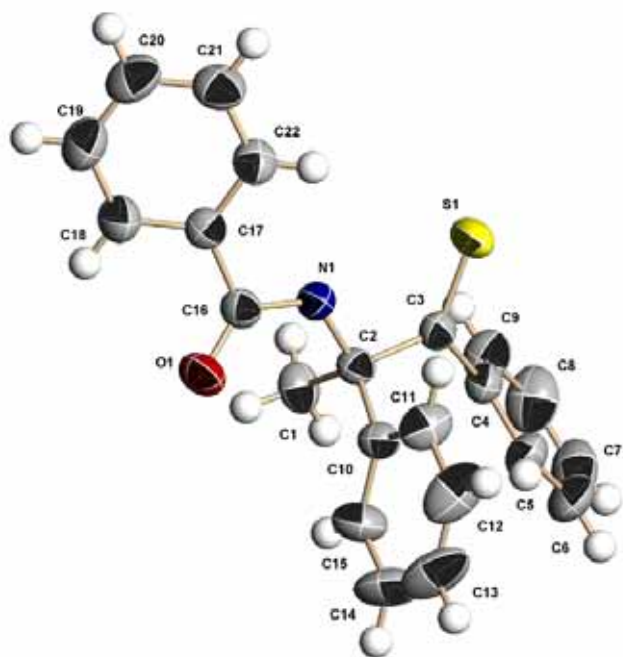


Fig. S3 View of **2a** showing the atoms and thermal ellipsoids at 40% probability..

Crystal data: for (**R**)-**2b** (recrystallized from a mixture of CHCl_3 and hexane), $\text{C}_{23}\text{H}_{21}\text{NOS}$, $M_r = 359.47$, orthorhombic, space group $P2_12_12_1$, $a = 9.7025(7) \text{ \AA}$, $b = 9.9727(7) \text{ \AA}$, $c = 20.1303(15) \text{ \AA}$, $V = 1947.8(2) \text{ \AA}^3$, $Z = 4$, $\rho = 1.229 \text{ Mg m}^{-3}$; in the final least-square refinement cycles on F^2 , the model converged an $R_1 = 0.0372$, $wR_2 = 0.0534$ for 4445 reflections. Absolute structure parameter 0.03(5). CCDC 611156.

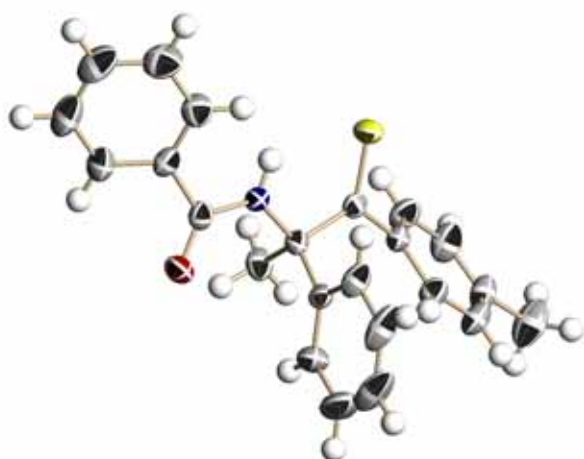


Fig. S4 View of **2b** showing the atoms and thermal ellipsoids at 40% probability.

Crystal data: for (**R**)-**2d** (recrystallized from a mixture of CHCl₃ and hexane) C₂₂H₁₈ClNOS, *Mr* = 379.88, orthorhombic, space group *P*2₁2₁2₁, *a* = 9.6375(5) Å, *b* = 10.0167(5) Å, *c* = 20.0523(10) Å, *V* = 1935.77(17) Å³, *Z* = 4, ρ = 1.314 Mg m⁻³; in the final least-square refinement cycles on *F*², the model converged an *R*₁ = 0.0346, *wR*₂ = 0.0746 for 4458 reflections. Absolute structure parameter -0.05(5). CCDC 611157.

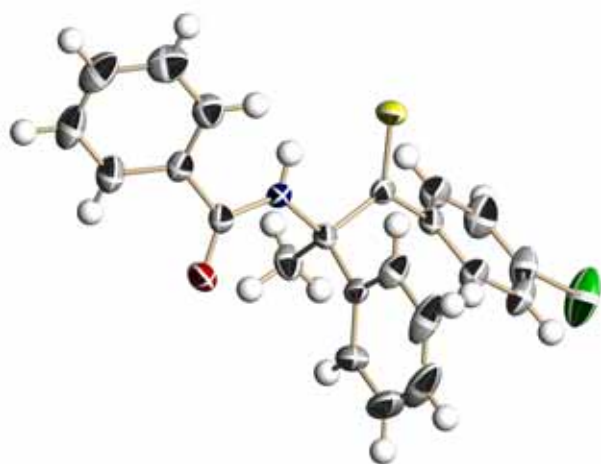


Fig. S5 View of **2d** showing the atoms and thermal ellipsoids at 40% probability.