Electronic Supplementary Information (ESI)

Stereoselective synthesis and reaction of gold(I) (Z)-enethiolate

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**General Information.** IR spectra were recorded on JASCO FT/IR-420 spectrometers. 1H NMR and 13C NMR spectra were obtained on either a JEOL JNM-AL300, JNM-AL400, or Bruker AV400 spectrometers. Chemical shifts (d) are reported in parts per million (ppm) downfield from internal Me$_4$Si. Mass spectra (MS) were obtained on either a Waters LCT Premier, or SHIMADZU Model GCMS-QP 505 spectrometer. Preparative thin layer chromatography (TLC) was carried out on precoated plates of silica gel (MERCK, silica gel F-254). Kieselgel 60 (MERCK, 230-400 mesh) was used for column chromatography. Melting points were determined with Yanaco micro melting points apparatus and are uncorrected.

**Substrate.** (Z)-β-alkylvinylthioimidonium tetrafluoroborate 5 were prepared from corresponding (E)-β-alkylvinyl-λ^3^-iodanes according to a literature method.$^{31}$ AuCl-tetrahydrothiophene complex 6 was prepared by the reaction of tetrachloroaurationic acid and tetrahydrothiophene according to a literature method.$^{32}$ 1,3-Dimesityl-3,4,5,6-tetrahydropyrimidin-1-ium bromide was prepared according to a literature method as shown below.$^{33}$

**Synthesis of Gold Enethiolate 7.** Gold (Z)-1-decenythiolate (7a). To a stirred solution of gold(I) chloride-tetrahydrothiophene complex (6) (22.0 mg, 0.068 mmol) in THF (1.1 mL) was added (Z)-S-1-decenyl-N,N-(dimethyl)thiobenzimidonium tetrafluoroborate (5a) (26.9 mg, 0.068 mmol) and 5% aqueous solution of Na$_2$CO$_3$ (290 µL, 0.136 mmol) under argon, and the mixture was stirred for 4 h at room temperature. The reaction was added small portion of water and resulting yellow precipitate was collected by filtration, which was purified by repeated washing with methanol and then with ethyl acetate to give pure 7a (22.4 mg, 90%) as a yellow amorphous. Mp 93-95℃ (decomposition); IR (Nujol) 2979, 2881, 2833, 1454, 1377, 721 cm$^{-1}$; $^1$H NMR (400 MHz, CDCl$_3$) δ 6.74-6.03 (m, 1H), 5.83-5.50 (m, 1H), 2.54-2.10 (m, 2H), 1.50-1.19 (m, 12H), 0.89 (t, $J = 6.6$ Hz, 3H); HRMS (ESI, negative, THF:MeOH = 1:1) for monomer: calcd for C$_{10}$H$_{19}$S [(M-Au)$^-$], 171.1207, found 171.1213; for dimer: calcd for C$_{20}$H$_{38}$Au$_2$S$_2$ [(M$_2$-Au)$^-$] 539.2081, found 539.2034; for trimer: calcd for C$_{30}$H$_{57}$Au$_3$S$_3$ [(3M-Au)$^-$] 907.2954, found
Gold (Z)-3-phenyl-1-propenylthiolate (7b): a yellow powder; mp 157-160 °C (decomposition); IR (neat) 3059, 3024, 1601, 1493, 1452, 1317, 1281, 1074, 1030, 750, 696 cm⁻¹; ¹H NMR (400 MHz, CDCl₃) δ 7.32-6.81 (m, 5H), 6.76-5.50 (m, 2H), 3.95-3.36 (m, 2H); HRMS (ESI, negative, CHCl₃:MeOH = 1:1) calcd for C₁₈H₁₈S₂Au [(2M-Au)-] 495.0516, found 495.0514.

Gold (Z)-1-decenylthiolate (7a) (10.2 mg, 0.028 mmol) was added in one portion. The mixture was gradually warmed to room temperature and stirred for 5 h. After addition of water, the mixture was extracted with diethyl ether four times. Combined organic phase was dried over anhydrous Na₂SO₄, filtered, and concentrated under aspiratory vacuum to give (Z)-1-decenylthiolato(triphenylphosphine)gold (8a) (32.2 mg, 95%) as a colorless oil. IR (neat) 3053, 2924, 2850, 1587, 1479, 1435, 1346, 1309, 1182, 1028, 999, 746, 710, 692 cm⁻¹; ¹H NMR (300 MHz, CDCl₃) δ 7.59-7.39 (m, 15H), 6.62 (d, J = 9.1 Hz, 1H), 5.59 (dt, J = 9.1, 6.8 Hz, 1H), 2.44 (q, J = 6.8 Hz, 2H), 1.47-1.13 (m, 12H), 0.86 (t, J = 6.3 Hz, 3H); ¹³C NMR (75 MHz, CDCl₃) δ 134.2 (d, J⁰cp = 13.7 Hz), 131.7, 131.6, (d, J⁰cp = 2.5 Hz), 129.7 (d, J<sub>cp</sub> = 55.4 Hz), 129.1 (d, J<sub>cp</sub> = 11.2 Hz), 123.4, 31.9, 29.6(2C), 29.4, 29.3, 28.7, 22.7, 14.1; HRMS (ESI, positive) calcd for C₂₈H₃₄AuNaSP [(M+Na)+] 653.1682, found 653.1686.

Synthesis of Gold Enethiolate-NHC Complex 9a. To a stirred solution of 1,3-diisopropylimidazolium chloride (7.5 mg, 0.04 mmol) in THF (2 mL) was added 1.63 M butyllithium (29 µl, 0.047 mmol) in hexane at -78 °C under argon, and the mixture was gradually warmed to room temperature for 3.5 h. The resulting NHC solution was then cooled to -30 °C and gold (Z)-1-decenylthiolate (7a) (10.2 mg, 0.028 mmol) was added in one portion. The mixture was gradually warmed to room temperature and stirred for 5 h. After addition of water, the mixture was extracted with diethyl ether four times. Combined organic phase was dried over Na₂SO₄, filtered, and concentrated under an aspiratory vacuum to give (Z)-1-decenylthiolato(1,3-diisopropylimidazol-2-ylidene)gold (9a) (18.6 mg, 89 %) as a colorless oil. IR (neat) 2972, 2924, 2852, 1462, 1431, 1415, 1394, 1371, 1211 cm⁻¹; ¹H NMR (400 MHz, CDCl₃) δ 6.96 (s, 2H), 6.60 (d, J = 8.5 Hz, 1H),
5.54 (dt, $J = 8.5$, 6.6 Hz, 1H), 5.07 (sept, $J = 6.6$ Hz, 2H), 2.43 (q, $J = 6.6$ Hz, 2H), 1.51-1.17 (m, 12H), 1.46 (d, $J = 6.6$ Hz, 12H), 0.87 (t, $J = 7.3$ Hz, 3H); $^{13}$C NMR (75 MHz, CDCl$_3$) δ 180.2, 130.8, 124.9, 116.5, 53.2, 32.0, 29.7, 29.6, 29.5, 29.4, 28.4, 23.4, 22.7, 14.1; HRMS (ESI, positive) calcd for C$_{19}$H$_{35}$AuN$_2$NaS [(M+Na)$^+$] 543.2084, found 543.2082.

**Synthesis of Gold Enethiolate-NHC Complex 10a.** To a stirred solution of 1,3-bis[1,3,5-(trimethyl)phenyl]-3,4,5,6-tetrahydropyrimidin-1-ium bromide (25.7 mg, 0.064 mmol) and gold (Z)-1-decenylthiolate (7a) (10.7 mg, 0.029 mmol) in THF (2 mL) was added 0.26 M lithium tert-butoxide (267 µl, 0.069 mmol) in THF at room temperature under argon, and the mixture was warmed to 45 °C and stirred at the temperature for 14 h. After addition of water, the mixture was extracted with hexane four times. Combined organic phase was dried over Na$_2$SO$_4$, filtered, and concentrated under an aspiratory vacuum to give an oil, which was washed several times with hexane by decantaion at room temperature to give (Z)-1-decenylthiolato{1,3-bis[1,3,5-(trimethyl)phenyl]-3,4,5,6-tetrahydropyrimidin-2-ylidene}gold (10a) (19.4 mg, 97 %) as colorless oil. Recrystallization from ethyl acetate-hexane at 4 °C yielded pure complex 10a as colorless prisms. mp 136-138 °C; IR (neat) 2922, 2852, 1608, 1520, 1479, 1402, 1375, 1344, 1308, 1207, 1032, 852, 754 cm$^{-1}$; $^1$H NMR (400 MHz, CDCl$_3$) δ 6.90 (s, 4H), 5.48 (dt, $J = 9.2$ 1.5 Hz, 1H), 5.11 (dt, $J = 9.2$, 7.0 Hz, 1H), 3.40 (t, $J = 6.2$ Hz, 4H), 2.32 (t, $J = 6.2$ Hz, 2H), 2.27 (s, 12H), 2.25 (s, 6H), 2.07 (q, $J = 7.0$ Hz, 2H), 1.29-1.15 (m, 12H), 0.85 (t, $J = 7.0$ Hz, 3H); $^{13}$C NMR (75 MHz, CDCl$_3$) δ 201.8, 141.8, 138.0, 134.8, 129.6, 129.0, 125.8, 45.2, 31.9, 29.6, 29.3, 27.8, 22.7, 21.1, 21.0, 18.0, 14.1; HRMS (ESI, positive) calcd for C$_{32}$H$_{47}$AuN$_2$NaS [(M+Na)$^+$] 711.3023, found 711.2952. Anal. Calcd for C$_{32}$H$_{47}$AuN$_2$S•1/4H$_2$O: C, 55.43; H, 6.91; N, 4.04. Found: C, 55.22; H, 6.94; N, 4.02.

**General Procedure for Alkylation of Gold (Z)-Enethiolates. A Typical Example (Table 1, entry 6).** To a stirred solution of (Z)-1-decenylthiolato{1,3-bis[1,3,5-(trimethyl)phenyl]-3,4,5,6-tetrahydropyrimidin-2-ylidene}gold (10a) (14.6 mg, 0.021 mmol) in dichloromethane (2.0 mL) was added TEMPO (0.3 mg, 0.0021 mmol) and iodomethane (30.1 mg, 0.21 mmol) under argon, and the mixture was stirred at room temperature for 30 min. The reaction mixture was washed with water and the aqueous layer was extracted with dichloromethane four times. Combined organic phase was dried over anhydrous Na$_2$SO$_4$, filtered, and concentrated under aspiratory vacuum to give an oil, which was purified by silica gel column chromatography using
hexane to give (Z)-1-decenyl methyl sulfide (11a) (3.7 mg, 95%) as a colorless oil. The Z:E ratio was determined by \(^1\)H NMR of a crude oil. (Z)-11a: \(^1\)H NMR (400 MHz, CDCl\(_3\)) \(\delta\) 5.86 (d, \(J = 9.1\) Hz, 1H), 5.53 (dt, \(J = 9.1, 7.3\) Hz, 1H), 2.27 (s, 3H), 2.11 (q, \(J = 7.3\) Hz, 2H), 1.44-1.28 (m, 4H), 0.91 (t, \(J = 7.3\) Hz, 3H).

(Z)-1-decenyl ethyl sulfide (11b) (Table 1, Entry 7): \(^1\)H NMR (400 MHz, CDCl\(_3\)) \(\delta\) 5.91 (d, \(J = 9.1\) Hz, 1H), 5.57 (dt, \(J = 9.1, 6.9\) Hz, 1H), 2.67 (q, \(J = 6.9\) Hz, 2H), 2.11 (q, \(J = 6.9\) Hz, 2H), 1.44-1.20 (m, 15H), 0.88 (t, \(J = 6.9\) Hz, 3H).

(Z)-1-decenyl isopropyl sulfide (11c) (Entry 9): IR (neat) 2958, 2924, 2854, 1607, 1462, 1243, 770 cm\(^{-1}\); \(^1\)H NMR (400 MHz, CDCl\(_3\)) \(\delta\) 5.98 (d, \(J = 9.4\) Hz, 1H), 5.58 (dt, \(J = 9.4, 7.0\) Hz, 1H), 3.05 (sept, \(J = 6.6\) Hz, 1H), 2.11 (dt, \(J = 7.0, 6.8\) Hz, 2H), 1.42-1.18 (m, 12H), 1.31 (d, \(J = 6.6\) Hz, 6H), 0.87 (t, \(J = 6.5\) Hz, 3H).

(Z)-1-Decenyl allyl sulfide (11d) (Entry 12): \(^1\)H NMR (400 MHz, CDCl\(_3\)) \(\delta\) 5.87 (d, \(J = 9.1\) Hz, 1H), 5.84 (ddt, \(J = 17.6, 10.6, 7.3\) Hz, 1H), 5.58 (dt, \(J = 9.1, 6.9\) Hz, 1H), 5.16 (d, \(J = 17.6\) Hz, 1H), 5.11 (d, \(J = 10.6\) Hz, 1H), 3.28 (d, \(J = 7.3\) Hz, 2H), 2.11 (q, \(J = 6.9\) Hz, 2H), 1.43-1.18 (m, 12H), 0.88 (t, \(J = 6.5\) Hz, 3H).

(Z)-1-Decenyl benzyl sulfide (11e) (Entry 13): \(^1\)H NMR (400 MHz, CDCl\(_3\)) \(\delta\) 7.36-7.28 (m, 5H), 5.89 (d, \(J = 9.2\) Hz, 1H), 5.55 (dt, \(J = 9.2, 7.0\) Hz, 1H), 3.86 (s, 2H), 2.07 (q, \(J = 6.9\) Hz, 2H), 1.39-1.16 (m, 12H), 0.88 (t, \(J = 6.6\) Hz, 3H).

(Z)-1-Decenyl phenacyl sulfide (11f) (Entry 14): \(^1\)H NMR (400 MHz, CDCl\(_3\)) \(\delta\) 7.97 (d, \(J = 7.3\) Hz, 2H), 7.58 (t, \(J = 7.3\) Hz, 1H), 7.47 (t, \(J = 7.3\) Hz, 2H), 5.97 (d, \(J = 9.1\) Hz, 1H), 5.65 (dt, \(J = 9.1, 6.9\) Hz, 1H), 3.95 (s, 2H), 2.07 (q, \(J = 6.9\) Hz, 2H), 1.37-1.14 (m, 12H), 0.87 (t, \(J = 6.9\) Hz, 3H).

Bis((Z)-1-decenylthio)methane (13): \(^1\)H NMR (400 MHz, CDCl\(_3\)) \(\delta\) 6.06 (d, \(J = 9.1\) Hz, 2H), 5.69 (dt, \(J = 9.1, 6.9\) Hz, 2H), 3.87 (s, 2H), 2.12 (q, \(J = 6.9\) Hz, 4H), 1.44-1.17 (m, 24H), 0.88 (t, \(J = 6.6\) Hz, 6H).

Nucleophilic Substitution of 2,4-dinitrohalobenzene with Gold (Z)-Enethiolates. A Typical Example (Scheme 6, Reaction of 10a with 14b). To a stirred solution of (Z)-1-decenylthiolato{1,3-bis[1,3,5-(trimethyl)phenyl]-3,4,5,6-tetrahydropyrimidin-2-ylidene}gold (10a) (13.4 mg, 0.019 mmol) in THF (2.0 mL) was added TEMPO (0.3 mg, 0.002 mmol) and 2,4-dinitro-1-bromobenzene (4.8 mg, 0.019 mmol) under argon, and the mixture was stirred at room temperature for 24 h. The reaction mixture was washed with water and the aqueous layer was extracted with dichloromethane four times. Combined organic phase was dried over
anhydrous Na₂SO₄, filtered, and concentrated under aspiratory vacuum to give a yellow oil, which was purified by preparative TLC (hexane:diethyl ether = 6:4) to give (Z)-1-deceny1 2,4-dinitrophenyl sulfide (15) (5.6 mg, 88%) as yellow oil. The Z:E ratio was determined by ¹H NMR of a crude oil. (Z)-15:¹H NMR (400 MHz, CDCl₃) δ 9.09 (d, J = 2.6 Hz, 1H), 8.34 (dd, J = 8.8, 2.6 Hz, 1H), 7.66 (d, J = 8.8 Hz, 1H), 6.45 (dt, J = 9.1, 6.9 Hz, 1H), 6.19 (d, J = 9.1 Hz, 1H), 2.39 (q, J = 6.9 Hz, 2H), 1.51-1.41 (m, 2H), 1.38-1.17 (m, 10H), 0.87 (t, J = 6.6 Hz, 3H); ¹³C NMR (75 MHz, CDCl₃) δ 145.4, 144.7, 143.9, 143.4, 127.7, 126.0, 120.7, 116.3, 30.9, 28.4, 28.3(2C), 27.9, 21.7, 13.2.

(E)-1-Decenyl 2,4-dinitrophenyl sulfide (15): yellow oil: IR (neat) 3105, 2925, 2854, 1595, 1523, 1456, 1340, 1304, 1051, 962, 918, 833, 735 cm⁻¹; ¹H NMR (400 MHz, CDCl₃) δ 9.09 (d, J = 1.8 Hz, 1H), 8.34 (dd, J = 7.7, 1.8 Hz, 1H), 7.65 (d, J = 7.7 Hz, 1H), 6.46 (dt, J = 14.7, 7.4 Hz, 1H), 6.14 (dt, J = 14.7, 1.5 Hz, 1H), 2.33 (dq, J = 7.4, 1.5 Hz, 2H), 1.56-1.18 (m, 12H), 0.90 (t, J = 6.6 Hz, 3H); ¹³C NMR (75 MHz, CDCl₃) δ 148.5, 147.4, 144.3, 144.2, 128.3, 126.9, 121.6, 116.5, 33.5, 31.9, 29.3, 29.2(2C), 28.5, 22.7, 14.1 ; MS m/z (relative intensity) 338 (M⁺, 73 %), 239 (35), 183 (100), 137 (51), 83 (51); HRMS calcd for C₁₆H₂₂O₄N₂S (M⁺) 338.1300, found 338.1310.

Michael Addition of Gold (Z)-Enethiolate to Cycloalkenone. A Typical Example (Scheme 8, Reaction of 7a with 15b). To a stirred solution of gold (Z)-1-deceny1thiolate (7a) (17.2 mg, 0.047 mmol) was added triphenylphosphine (24.7 mg, 0.094 mmol) in dichloromethane (3.5 mL) under argon, and stirred at room temperature for 10 min. After addition of lithium iodide (37.6 mg, 0.28 mmol) to the resulting (Z)-gold thiolate-PPh₃ complex solution, 2-cyclohexen-1-one (4.5 mg, 0.047 mmol) was added and stirred at room temperature for 24 h. The reaction mixture was washed with water and the aqueous layer was extracted with dichloromethane four times. Combined organic phase was washed with brine, dried over anhydrous Na₂SO₄, filtered, and concentrated under aspiratory vacuum to give a yellow oil, which was purified by column chromatography (dichloromethane-ethyl acetate 9:1) to give 3-[(Z)-1-deceny1thio]cyclohexanone (16b) (9.6 mg, 76%) as a colorless oil; IR (neat) 2925, 2854, 2854, 1715, 1457, 1313, 1220 cm⁻¹; ¹H NMR (400 MHz, CDCl₃) δ 5.92 (d, J = 9.2 Hz, 1H), 5.68 (dt, J = 9.2, 7.0 Hz, 1H), 3.21-3.11 (m, 1H), 2.73 (dd, J = 14.6, 3.6 Hz, 1H), 2.46-2.25 (m, 3H), 2.22-2.03 (m, 4H), 1.83-1.65 (m, 2H), 1.43-1.18 (m, 12H), 0.88 (t, J = 6.6 Hz, 3H); ¹³C NMR (75 MHz, CDCl₃) δ 208.6, 132.8, 121.2, 48.2, 44.7, 40.9, 31.9, 31.6, 29.4, 29.3, 29.2(2C), 28.9, 24.1, 22.7, 14.1.

3-[(Z)-1-Deceny1thio]cyclopentanone (16a): a colorless oil; IR (neat) 2925, 2854, 1747, 1608,
1457, 1403, 1274, 1248, 1157 cm\(^{-1}\); \(^1\)H NMR (400 MHz, CDCl\(_3\)) \(\delta\) 5.94 (d, \(J = 9.2\) Hz, 1H), 5.71 (dt, \(J = 7.0, 9.2\) Hz, 1H), 3.61 (quint, \(J = 7.3\) Hz, 1H), 2.62 (dd, \(J = 18.3, 7.3\) Hz, 1H), 2.54-2.19 (m, 3H), 2.19-1.98 (m, 4H), 1.44-1.19 (m, 12H), 0.88 (t, \(J = 6.6\) Hz, 3H); MS \(m/z\) (relative intensity) 254 (12\%, M\(^+\)), 191 (8), 171 (9), 96 (42), 82 (100): HRMS calcd for C\(_{15}\)H\(_{26}\)OS (M\(^+\)) 254.1704, found 254.1718.

3-[(Z)-1-Decenylthio]cycloheptanone (16c): a colorless oil; IR (neat) 2925, 2854, 1703, 1608, 1456, 1346, 1284, 1192, 935, 889, 723 cm\(^{-1}\); \(^1\)H NMR (400 MHz, CDCl\(_3\)) \(\delta\) 5.93 (d, \(J = 9.2\) Hz, 1H), 5.69 (t, \(J = 9.2, 7.3\) Hz, 1H), 3.11 (tt, \(J = 9.2, 2.9\) Hz, 1H), 2.87-2.73 (m, 2H), 2.61-2.44 (m, 2H), 2.20-2.07 (m, 3H), 2.03-1.63 (m, 4H), 1.60-1.49 (m, 1H), 1.42-1.20 (m, 12H), 0.88 (t, \(J = 7.3\) Hz, 3H); \(^{13}\)C NMR (75 MHz, CDCl\(_3\)) \(\delta\) 211.6, 132.8, 122.0, 50.2, 44.0, 43.1, 37.4, 31.9, 29.4, 29.3, 29.2, 29.0, 28.1, 23.9, 22.7, 14.1; MS \(m/z\) (relative intensity): 282 (13\%, M\(^+\)), 171 (26), 138 (30), 111 (43), 96 (25), 83 (100), 81 (60): HRMS calcd for C\(_{17}\)H\(_{30}\)OS (M\(^+\)) 282.2017, found 282.2057.

**Job Plot.** Equimolar solutions (0.17 M) of (Z)-gold thiolate 7a and triphenylphosphine were prepared and mixed in various amount. \(^{13}\)C NMR spectra of the mixture were recorded at room temperature, and the complexation induced chemical shifts of an \textit{ipso} carbon of triphenylphosphine were analyzed by the method developed by Newcomb and co-workers.\(^{57}\)

\(^{13}\)C NMR Titration. A solution of triphenylphosphine (0.178 M) in CDCl\(_3\) was prepared. Nine NMR tunes were each filled with the solution and with an adequate amount of (Z)-gold thiolate 7a (0-2.2 equiv). \(^{13}\)C NMR spectra of the mixtures were recorded at room temperature. The curve-fittings of the chemical shift data of an \textit{ipso} carbon of triphenylphosphine were carried out by a nonlinear least-squares method (Marquardt–Levenberg Algorithm) according to the reported equation\(^{8}\) with use of SigmaPlot (Jandel Scientific, San Rafael, CA).
2. ESI-MS spectrum observed for gold (Z)-enethiolate 7a

**Figure S1.** ESI-MS spectrum observed for gold (Z)-enethiolate 7a in CH$_2$Cl$_2$-MeOH (1:1). No monomeric gold enethiolate 7a species [M-Au]$^+$ was detected under the conditions.
3. Job plot for complexation of gole (Z)-enethiolate 7a with triphenylphosphine

\[
\begin{align*}
n-C_8H_{17}\text{Ag} + \text{PPh}_3 \xrightleftharpoons{\text{CDCl}_3 \text{ rt}} n-C_8H_{17}\text{Ag-PPh}_3
\end{align*}
\]

7a \quad \text{total 0.17 M}

\[
\begin{align*}
|\Delta\delta| \times X_{\text{PPh}_3}
\end{align*}
\]

\(\delta: {^{13}}\text{C NMR chemical shift of ipso carbon of PPh}_3\)
\(X_{\text{PPh}_3}: \text{mol fraction of PPh}_3\)

**Figure S2.** Job plot for complexation between gole (Z)-enethiolate 7a and triphenylphosphine in CDCl\(_3\) at rt.
4. Observed $^{13}$C NMR chemical shifts of PPh$_3$ (0.178 M) when titrated with 7a in CDCl$_3$ at rt

Figure S3. Observed $^{13}$C NMR chemical shifts of PPh$_3$ (0.178 M) when titrated with 7a in CDCl$_3$ at rt.
5. Isomerization of 8a in CDCl₃ at 23 °C in the dark.

**Figure S4.** Effect of additives on the configurational stability of gold (Z)-enethiolate-PPh₃ complex 8a in CDCl₃ (0.01 M) at 23 °C in the dark. The filled blue circle means under argon. The filled pink circle means under air. The filled yellow circle means in the presence of TEMPO (0.1 equiv) under Ar.

**References**

6. Spectra
$n$-C$_{17}$H$_{35}$-S= Au-PP$_3$

8a

$^1$H NMR, 400 MHz, CDCl$_3$

8a

75 MHz, $^{13}$C NMR, CDCl$_3$
$\text{H NMR, 400 MHz, CDCl}_3$

$\text{C NMR, CDCl}_3$

$\text{75 MHz, }^{13}\text{C NMR, CDCl}_3$
\[
\text{\textsuperscript{1}H NMR, 400 MHz, CDCl}_3
\]

\[
\text{\textsuperscript{13}C NMR, 75 MHz, CDCl}_3
\]