to that for simple thiolate ligands.[18] The novel Pt–S–S–$CH(CH_3)_2$ grouping features a sulfur–sulfur distance of 2.037 (4) Å and a torsion angle of 89.5°. In the tungsten complex[19,20] the W–S–S–$C_6H_4CH_3$ fragment has a sulfur–sulfur distance of 2.053 (4) Å and a torsion angle of 63.1°. The sulfur–sulfur bond distances in these two complexes are in the range found for most organic and inorganic disulfides.[21] However, while the PtSSC torsion angle is close to that found for open-chain organic disulfides (85 ± 20°)[22] the WSSC angle is much smaller[23] and outside this range.

These compounds are among the first linear representatives of a potentially large new class of complexes containing catenated-sulfur ligands. The preparative routes reported here are suitable for general application.

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Registry No. $CpW(CO)_3SH$, 51187-51-0; $NphtSCH_2C_6H_5$, 14204-26-3; NphtS-*p*-$C_6H_4CH_3$, 15199-26-5; $NphtSSCH_2C_6H_5$, 33704-38-0; NphtSS-*p*-$C_6H_4CH_3$, 33704-37-9; $NphtS(=O)CH_2C_6H_5$, 40167-14-4; NphtS(=O)-*p*-$C_6H_4CH_3$, 42300-58-3; $CpW(CO)_3SCH_2C_6H_5$, 85882-86-6; $CpW(CO)_3S$-*p*-$C_6H_4CH_3$, 58057-63-9; $CpW(CO)_3SSCH_2C_6H_5$, 85882-87-7; $CpW(CO)_3SS$-*p*-$C_6H_4CH_3$, 85882-88-8; $CpW(CO)_3S(=O)CH_2C_6H_5$, 85893-30-7; $CpW(CO)_3S(=O)$-*p*-$C_6H_4CH_3$, 85893-31-8; NphtSNpht, 7764-29-6; $CH_3CH_2CH_2SNpht$, 17796-71-3; $(CH_3)_2CHSNpht$, 17796-72-4; $NphtS_2Npht$, 7764-30-9; $CH_3CH_2CH_2S_2Npht$, 30912-77-7; $(CH_3)_2CHS_2Npht$, 33704-40-4; *cis*-$(PPh_3)_2Pt(Npht)(SCH_2CH_2CH_3)$, 85882-89-9; *cis*-$(PPh_3)_2Pt(Npht)(S_2CH_2CH_2CH_3)$, 85882-90-2; *cis*-$(PPh_3)_2Pt(Npht)(SCH(CH_3)_2)$, 85882-91-3; *cis*-$(PPh_3)_2Pt(Npht)(S_2CH(CH_3)_2)$, 85882-92-4; *cis*-$(PPh_3)_2Pt(Npht)(SCH_2C_6H_5)$, 85882-93-5; *cis*-$(PPh_3)_2Pt(Npht)(S_2CH_2C_6H_5)$, 85882-94-6; *cis*-$(PPh_3)_2Pt(Npht)$(S-*p*-$C_6H_4CH_3$), 85882-95-7; *cis*-$(PPh_3)_2Pt(Npht)$($S_2$-*p*-$C_6H_4CH_3$), 85882-96-8; *cis*-$(PPh_3)_2Pt(Npht)(SNpht)$, 85882-97-9; *cis*-$(PPh_3)_2Pt(Npht)(S_2Npht)$, 85882-98-0; $(PPh_3)_2PtC_2H_4$, 85882-99-1; PPh_3, 603-35-0.

Supplementary Material Available: Positional and thermal parameters, bond distances and bond angles with their estimated standard deviations, and listings of structure factor amplitudes for the complexes *cis*-$(PPh_3)_2Pt(Npht)SSCH(CH_3)_2$ and $CpW(CO)_3$-SS-*p*-$C_6H_4CH_3$ (29 pages). Ordering information is given on any current masthead page.

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[17] Crystal Data: $C_{15}H_{12}O_3S_2W$, M_r = 1904.53, red, brick-shaped, monoclinic, space group $P2_1/c$, $Z = 4$, D_{calcd} = 2.032 g cm^{-3}, a = 10.640 (3) Å, b = 11.400 (3) Å, c = 12.872 (3) Å, β = 94.58 (2)°, U = 1556.3 Å^3. The structure was solved by using 1672 reflections with $I > 3\sigma(I)$ collected in the range 3.5° < 2θ < 45.0°. The final residuals are R_F = 4.0% and R_{wF} = 5.5%.

[18] Bird, P. H.; Lai, R. D.; Shaver, A.; Siriwardane, U. *Can. J. Chem.* **1982**, *60*, 2075–2081.

[19] The W–S1 distance is 2.506 (2) Å. The Cp ring is titled slightly: C12 is farthest from W (2.397 (9) Å), while C14 and C15 are nearest (2.304 (9) and 2.313 (9) Å, respectively). Similar tilting has been observed for the complexes $CpM(CO)_3Cl$, M = Mo and W: Bueno, C.; Churchill, M. R. *Inorg. Chem.* **1981**, *20*, 2197–2202 and is predicted on the basis of molecular orbital calculations.[20]

[20] The conformation of the S1–S2 bond with respect to the $CpW(CO)_3$ fragment is as predicted: Kubacek, P.; Hoffmann, R.; Havlas, Z. *Organometallics* **1982**, *1*, 180–188.

[21] (a) Sutton, L. E. "Tables of Interatomic Distances and Configurations in Molecules and Ions"; The Chemical Society: Burlington House, London, 1958; *Spec. Publ.—Chem. Soc. No. 11*; 1965; *Spec. Publ.—Chem. Soc. No. 18*; Suppl. (1956–1959)). (b) Laur, P. H. In "Sulfur in Organic and Inorganic Chemistry"; Senning, A., Ed.; Marcel Dekker: New York, 1972; Vol. 3.

[22] (a) Van Wart, H. E.; Scheraga, H. A. *Proc. Natl. Acad. Sci. U.S.A.* **1977**, *74*, 13–17 and references therein. (b) Guttenberger, H. G.; Bestmann, H. J.; Dickert, F. L.; Jorgensen, F. S.; Snyder, J. P. *J. Am. Chem. Soc.* **1981**, *103*, 159–168 and references therein.

[23] No significant intermolecular contacts were observed.

Book Reviews

Multiple Bonds Between Metal Atoms. By F. A. Cotton and R. A. Walton. Wiley-Interscience, New York. 1982. xiv + 466 pages. $47.50.

This book, with a foreword by R. Hoffmann, is the first to be published dealing only with compounds containing multiple bonds between metal atoms and is written by two accomplished practitioners in the field. The authors have covered the literature through 1980, and some of the early literature of 1981 is also included. Spot checks against this reviewer's files indicate that the coverage is exceptionally complete.

The book covers all aspects of the chemistry of compounds with metal–metal multiple bonds as indicated by the chapter headings: Chapter 1, Introduction and Survey (35 pp); Chapter 2, Quadruple Bonds Between Rhenium and Technetium (48 pp); Chapter 3, Quadruple Bonds between Molybdenum and Tungsten (66 pp); Chapter 4, Quadruple Bonds between Chromium Atoms (33 pp); Chapter 5, Triple Bonds between Metal Atoms (82 pp); Chapter 6, Double Bonds between Metal Atoms (46 pp); Chapter 7, Dirhodium and Isoelectronic Compounds (28 pp); Chapter 8, Physical, Spectroscopic, and Theoretical Results (114 pp). Within each of the chapters, 2–7, the synthesis, structures, and reactivity of the various compounds are presented and discussed. Where possible, reactivity–structure correlations are made and tied in with the theoretical results.

The organization of the material is built primarily around structural classes, which is understandable given the importance (indeed, necessity) of structural results to the field and the paucity of *systematic* reactivity studies. The text is clearly written, although in places the sheer rapidity with which the reader is bombarded with information makes casual reading difficult. Much of the first chapter is an interesting history of "How It All Began" and a polemic on "non-Wernerian" chemistry.

The book is remarkably free of error (only two minor ones were noted). Material is readily accessible via the adequate index or the detailed Table of Contents. This book is highly recommended to anyone who would like to see what the field of metal–metal multiple bonds entails, to teachers and students of inorganic chemistry, and to researchers in the field. For the latter, a perspicacious reading will reveal many areas of potentially rewarding research.

M. David Curtis, *The University of Michigan*

Chemically Modified Surfaces in Catalysis and Electrocatalysis. Edited by J. S. Miller. ACS Symposium Series No. 192. American Chemical Society, Washington, D.C. 1982. ix + 301 pp. $36.95.

This volume contains 17 articles containing material that was presented at the American Chemical Society Meeting in New York