Bipodal acylthiourea ligands as building blocks for Bi-, Tetra-, and polynuclear oxorhenium(V) complexes

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Abstract: Reactions of $(NBu_4)[ReOCl_4]$ and 3,3,3?, 3?-tetraalkyl-1,1?-isophthaloylbis(thioureas), $H_2phth(R_2tu)_2$ where R = Et, i-Bu, in hot MeOH with the addition of Et_3N give red products of the composition $[ReO(OMe)\{phth(R_2tu)_2\}]_2$ (8a, R = Et; 8b, R = i-Bu). X-ray structures of 8 reveal symmetric binuclear complexes containing two almost coplanar organic ligands, each of which coordinates to two rhenium centers via the two bidentate-O,S moieties. The octahedral coordination spheres of the rhenium atoms are completed by each one oxo and one methoxido ligand which are directed perpendicular to the plane defined by the $\{phth(R_2tu)_2\}^{2-}$ ligands. While in 8a, both methoxido ligands point to the same side of the described plane and form a syn isomer, the MeO^- ligands in 8b are located at opposite sides and form an anti isomer. Studies in solution show that there exists a reversible equilibrium between the anti and syn isomers. Dimerization/condensation of complexes 8 with the formation of tetranuclear complexes of the composition $[\{ReO\{phth(R_2tu)_2\}\}_2O]_2$ (9) and/or polynuclear species is observed in solutions, which do not contain MeOH. ?? 2010 American Chemical Society.

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References:

1. Beyer, L., Hoyer, E., Liebscher, J., Hartmann, H., (1981) Z. Chem., 21, p. 228
2. Koch, K.R., (2001) Coord. Chem. Rev., 216-217, p. 473
3. Beyer, L., Hoyer, E., Hennig, H., Kirmse, R., Hartmann, H., Liebscher, J., (1975) J. Prakt. Chem., 317, p. 829
4. Schmidt, S., Dietze, F., Hoyer, E., (1991) Z. Anorg. Allg. Chem., 603, p. 33
5. Mohamadou, A., Dechamps-Olivier, I., Barbier, J.P., (1994) Polyhedron, 13, p. 1363
6. Del Campo, R., Criado, J.J., Gheorghe, R., Gonzalez, F.J., Hermosa, M.R., Sanz, F., Manzano, J.L., Rodriguez-Fernandez, E., (2004) J. Inorg. Biochem., 98, p. 1307
7. Del Campo, R., Criado, J.J., Garcia, E., Hermosa, M.R., Jimenez-Sanchez, A., Manzano, J.L., Monte, E., Sanz, F., (2002) J. Inorg. Biochem., 89, p. 74
8. Emen, F.M., Fl??rke, U., K?lc?, N., Arslan, H., (2003) Acta Crystallogr., 59, p. 582
9. Arslan, H., Fl??rke, U., K?lc?, N., (2004) Z. Kristallogr., New Cryst. Struct., 219, p. 409
10. Arslan, H., Vanderveer, D., Emen, F., K?lc?, N., (2003) Z. Kristallogr., New Cryst. Struct., 218, p. 479
11. Fitzl, G., Beyer, L., Sieler, J., Richter, R., Kaiser, J., Hoyer, E., (1977) Z. Anorg. Allg. Chem., 433, p. 237
12. Irving, A., Koch, K.R., Matoetoe, M., (1993) Inorg. Chim. Acta, 206, p. 193
13. Sacht, C., Datt, M.S., Otto, S., Roodt, A., (2000) J. Chem. Soc., Dalton Trans., p. 727
14. Arslan, H., K?lc?, N., Fl??rke, U., (2003) Trans. Met. Chem., 28, p. 816
15. Schr??der, U., Richter, R., Anguio-Conejo, J., Lino-Pacheco, M., Gullien, A., (2003) Z. Anorg. Allg. Chem., 629, p. 1081
16. Richter, R., Sieler, J., K??hler, R., Hoyer, E., Beyer, L., Leban, I., Golic, L., (1989) Z. Anorg. Allg. Chem., 578, p. 198
17. Rodenstein, A., Richter, R., Kirmse, R., (1713) Z. Anorg. Allg. Chem., 2007, p. 633
18. Bourne, S.A., Hallale, O., Koch, K.R., (2005) Cryst. Growth Des., 5, p. 307
19. Rodenstein, A., Griebel, J., Richter, R., Kirmse, R., (2008) Z. Anorg. Allg. Chem., 634, p. 867
20. Koch, K.R., Bourne, S.A., Coetzee, A., Miller, J., (1999) J. Chem. Soc., Dalton Trans., 18, p. 3157
21. Koch, K.R., Hallale, O., Bourne, S.A., Miller, J., Bacsa, J., (2001) J. Mol. Struct., 561, p. 185
22. Hallale, O., Bourne, S.A., Koch, K.R., (2005) New J. Chem., 29, p. 1416
23. Dilworth, J.R., Lewis, J.S., Miller, J.R., Yifan, Z., (1993) Polyhedron, 12, p. 221
24. Abram, U., Abram, S., Alberto, R., Schibli, R., (1996) Inorg. Chim. Acta, 248, p. 193
25. Nguyen, H.H., Abram, U., (2008) Z. Anorg. Allg. Chem., 634, p. 1560
26. Huy, N.H., Abram, U., (2007) Inorg. Chem., 46, p. 5310
27. Alberto, R., Schibli, R., Egli, A., Schubiger, P.A., Herrmann, W.A., Artus, G., Abram, U., Kaden, T.A., (1995) J. Organomet. Chem., 217, p. 492
28. K??hler, R., Kirmse, R., Richter, R., Sieler, J., Hoyer, E., Beyer, L., (1986) Z. Anorg. Allg. Chem., 537, p. 133
29. Sheldrick, G.M., (1997) SHELXS-97 and SHELXL-97, Programs for the Solution and Refinement of Crystal Structures, , University of G??ttingen: G??ttingen, Germany
30. Allen, F.H., Kennard, O., Watson, D.G., Brammer, L., Orpen, A.G., Taylor, R., (1987) J. Chem. Soc., Perkin Trans., 2, p. 1
31. Abram, U., Rhenium (2003) Comprehensive Coordination Chemistry II, 5, p. 271. , McCleverty, J. A. and Mayer, T. J., Eds.
32. Elsevier: Amsterdam, The Netherlands
33. Abram, S., Abram, U., Schulz Lang, E., Str??hle, J., (1995) Acta Crystallogr., 51, p. 1078. , references cited therein

34. Paulo, A., Domingos, A., Marcalo, J., Pires De Matos, A., Santos, I., (1995) Inorg. Chem., 34, p. 2113
35. Braband, H., Blatt, O., Abram, U., (2006) Z. Anorg. Allg. Chem., 632, p. 2251
36. Lawrence, A.B., Paul, E.W., Grant, N.H., (1997) Inorg. Chim. Acta, 255, p. 149
37. Benny, P.D., Barnes, C.L., Piekarski, P.M., Lydon, J.D., Jurisson, S.S., (2003) Inorg. Chem., 42, p. 6519
38. Gerber, T.I.A., Tshentu, Z.R., Garcia-Granda, S., Mayer, P., (2003) J. Coord. Chem., 56, p. 1093
39. Schroer, J., Wagner, S., Abram, U., (2010) Inorg. Chem., 49, p. 10694