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^{13}C-and ^{31}P-NMR Study of Tetracarbonylbis(diphenylphosphino) alkanemetal(0) Complexes of The Group 6 Elements

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Abstract: Tetracarbonylbis (diphenylphosphino)alkanemetal(0) complexes of the general formula $M(CO)_4[(C_6H_5)_2P(CH_2)_nP(C_6H_5)_2]$ (M: Cr, Mo, W; n: 1, 2, 3) were synthesized from the reaction of $M(CO)_4(\eta^{2:2}$-1,5-cyclooctadiene) with the appropriate ligand and characterized by means of IR and NMR (^{13}C and ^{31}P) spectroscopy. Spectroscopic data shows that two phosphorus atoms in the complexes are identical and occupy two cis-coordiantion sites in a pseudo-octahedral coordination sphere of the metal. The comparative study of the coordination shift and the ^{31}P-^{13}C coupling constant reveals that two carbonyl groups trans to one of two phosphorus atoms in the diphosphine ligand are shifted toward the