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REACTIONS OF BIS(TRIFLUOROMETHYL)PHOSPHINE AND TETRAKIS(TRIFLUOROMETHYL)PHOSPHINE WITH RUTHENIUM CARBONYL CLUSTERS

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Abstract The reaction of $(\text{CF}_3)_2\text{P}-\text{P}(\text{CF}_3)_2$ with $[\text{Ru}_3(\text{CO})_{12}]$ yielded compounds : $[\text{Ru}_4(\text{CO})_{13}\{\mu-\text{P}(\text{CF}_3)_2\}_2]$ (1), $[\text{Ru}_4(\text{CO})_{14}\{\mu-\text{P}(\text{CF}_3)_2\}_2]$ (2), and $[\text{Ru}_4(\text{CO})_{11}\{\mu-\text{P}(\text{CF}_3)_2\}_4]$ (3); reaction with $[(\mu-\text{H})_4\text{Ru}_4(\text{CO})_{12}]$ yielded (1) and $[(\mu-\text{H})_3\text{Ru}_4(\text{CO})_{12}\{\mu-\text{P}(\text{CF}_3)_2\}]$ (4). The reaction of $(\text{CF}_3)_2\text{PH}$ with $[\text{Ru}_3(\text{CO})_{12}]$ yielded compounds (1) and (4) and compounds (1) and (2) using cluster : ligand ratios of 1:1 and 1:2 respectively. All the compounds have been characterised by X-ray crystallography; a schematic diagram of their structures is shown in Figure 1. The fluxional behaviour of the hydrides in (4) was studied using variable temperature ^1H NMR spectroscopy (see Figure 2). The result of this study was used in the assignment of hydride positions of (4) in the solid state.

Key Words Tetraruthenium clusters, Bis(trifluoromethyl)phosphine, Tetrakis(trifluoromethyl)phosphine.

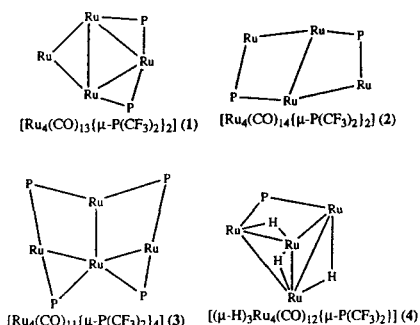


Figure 1. Schematic Diagram of Compounds (1), (2), (3) and (4) showing only the Ru-P Framework.

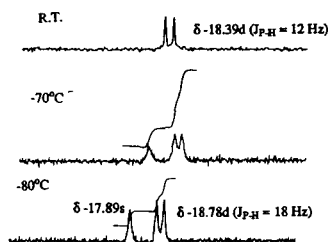


Figure 2. Variable Temperature ^1H NMR Spectra of (4)