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Triphospha-Ferrocenes as Ligands. Crystal Structures of $[\text{Fe}(\eta^5\text{-C}_5\text{Me}_5)(\eta^5\text{-C}_2\text{tBu}_2\text{P}_3)\text{M}(\text{CO})_5]$, (M= Cr, MO, W) and the Novel ruthenium and Nickel Complexes $[\text{Fe}(\eta^5\text{-C}_5\text{Me}_5)(\eta^5\text{-C}_2\text{tBu}_2\text{P}_3)\text{Ru}_3(\text{CO})_9]$ and $[\text{Fe}(\eta^5\text{-C}_5\text{Me}_5)(\eta^5\text{-C}_2\text{tBu}_2\text{P}_3)\text{Ni}(\text{Co})_2]_2$

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TRIPHOSPHA-FERROCENES AS LIGANDS. CRYSTAL STRUCTURES
OF $[\text{Fe}(\eta^5\text{-C}_5\text{Me}_5)(\eta^5\text{-C}_2\text{tBu}_2\text{P}_3)\text{M}(\text{CO})_5]$, (M= Cr, Mo, W) AND THE
NOVEL RUTHENIUM AND NICKEL COMPLEXES $[\text{Fe}(\eta^5\text{-C}_5\text{Me}_5)$
 $(\eta^5\text{-C}_2\text{tBu}_2\text{P}_3)\text{Ru}_3(\text{CO})_9]$ AND $[\text{Fe}(\eta^5\text{-C}_5\text{Me}_5)(\eta^5\text{-C}_2\text{tBu}_2\text{P}_3)\text{Ni}(\text{CO})_2]_2$

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Abstract Syntheses and structures of penta- and hexaphosphorus analogues of ferrocene have been described recently ¹. Unlike their simple ferrocene analogues, these complexes have further ligating potential towards other transition metal centres by virtue of the availability of the ring phosphorus lone-pair electrons that are not involved in the η^5 -coordination. We now describe the first examples of coordination compounds of the triphospha-ferrocene $[\text{Fe}(\eta^5\text{-C}_5\text{Me}_5)(\eta^5\text{-C}_2\text{tBu}_2\text{P}_3)]$. In the ruthenium complex $[\text{Fe}(\eta^5\text{-C}_5\text{Me}_5)(\eta^5\text{-C}_2\text{tBu}_2\text{P}_3)\text{Ru}_3(\text{CO})_9]$ ² two adjacent phosphorus atoms of the $\eta^5\text{-C}_2\text{tBu}_2\text{P}_3$ ring are interlinked by a ruthenium carbonyl cluster in which all three ruthenium atoms interact with the phosphorus atoms. The tetrametallic nickel complex $[\text{Fe}(\eta^5\text{-C}_5\text{Me}_5)(\eta^5\text{-C}_2\text{tBu}_2\text{P}_3)\text{Ni}(\text{CO})_2]_2$ ³ represents the first example of intermolecular interlinkage of two phospha-ferrocene systems by two metal centres.

Key Words: Metal complexes, phospha-ferrocenes, ³¹P NMR spectroscopy, X-ray crystal structure analysis

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