

Monodentate and bridging behavior of dinitriles ligands toward the fragment $\text{Cp}(\text{dppe})\text{Fe}^+$

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The reaction of $\text{Cp}(\text{dppe})\text{FeI}$ with the dinitriles $\text{NC}(\text{CH}_2)_n\text{CN}$ $n = 3, 4, 6$ in CH_3OH and using NH_4PF_6 as halide abstractor afford the monodentate dinitrile complexes $[\text{Cp}(\text{dppe})\text{Fe}(\eta^1\text{-NC}(\text{CH}_2)_n\text{CN})\text{PF}_6]$. Treatment of these mononuclear complexes with $\text{Cp}(\text{dppe})\text{FeI}$ afford the binuclear complexes $[\text{Cp}(\text{dppe})\text{Fe-NC}(\text{CH}_2)_n\text{CN-Fe}(\text{dppe})\text{Cp}](\text{PF}_6)_2$. All the new products were characterized by elemental analysis as well as IR, ^1H - ^{31}P - and ^{13}C -NMR spectroscopy and by UV-visible as well as cyclic voltammetry studies. The coordinative properties of nitriles were conveniently discussed using the ^{13}C -NMR data and MO arguments, finding that the ligands behave mainly as σ -donor. In the binuclear complexes the two $\text{Cp}(\text{dppe})\text{Fe}^+$ fragments are identical observing in the cyclic voltammogram only one oxidation wave. The high symmetry of the binuclear complexes is also corroborated by the spectroscopic results. Electrochemical results suggest no interaction between the metal centers.