**^{15}N AND ^{31}P NMR STUDIES OF
CYANO[(TRIALKYL/TRIARYL)PHOSPHINE]GOLD(I)
COMPLEXES $\text{R}_3\text{PAu}^{13}\text{C}^{15}\text{N}$**

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The ligand scrambling reaction of $\text{R}_3\text{PAuC}^{15}\text{N}$ to form $(\text{R}_3\text{P})_2\text{Au}^+$ and $\text{Au}(\text{C}^{15}\text{N})_2^-$ has been studied for $\text{R}=\text{Me}$, Et , $i\text{-Pr}$, and Ph . The reactions are studied by ^{15}N and ^{31}P NMR spectroscopy. Two ^{31}P NMR resonances were observed for R_3PAuCN and $(\text{R}_3\text{P})_2\text{Au}^+$ species. However, for the ^{15}N NMR, only averaged resonances were observed for $\text{R}_3\text{PAuC}^{15}\text{N}$ and $\text{Au}(\text{C}^{15}\text{N})_2^-$ species except for $\text{Et}_3\text{PAuC}^{15}\text{N}$, where two resonances were detected. The $\text{R}_3\text{PAu}^{13}\text{C}^{15}\text{N}$ complexes have also been prepared where $\text{R}=\text{Me}$, Et , and Ph . Analysis of ^{31}P NMR of $\text{R}_3\text{PAu}^{13}\text{C}^{15}\text{N}$ (where $\text{R}=\text{Me}$, Et and Ph) yielded $^2J(^{31}\text{P}-^{13}\text{C})$ values as 120.71, 122.18 and 124.57 Hz and $^3J(^{31}\text{P}-^{15}\text{N})$ values as 3.62, 2.93 and 4.02 Hz respectively. The equilibrium constant (K_{eq}) was measured to be 0.14 between -60°C to -40°C for Ph_3PAuCN and $\Delta G^\ddagger$ was determined by line-shape analysis of ^{31}P NMR peaks to be 39.7 ± 0.5 kJ/mol at 273 K.