Synthesis, Electronic Spectra and Solvent-Induced Reversible Dissociation of Diphosphine(hexamfluoroacetylacetonato)copper(I) Complexes

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The complexes CuI(P-P)(hfac) with P-P = 1,2-bis(diphenylphosphino)ethane (diphos), 1,3-bis-(diphenylphosphino)propane (prophos), 2,2'-bis(diphenylphosphino)-1,1'-binaphthyl (binap) and hfac = hexafluoroacetylacetonate were synthesized and spectroscopically characterized. In the solid state or in solutions of non-polar solvents these compounds are yellow owing to a long-wavelength (hfac$^-$ → P-P) ligand-to-ligand charge transfer absorption. In coordinating solvents such as CH$_3$CN the complexes undergo a reversible dissociation according to the equation:

$$\text{Cu(P-P)(hfac) + n CH}_3\text{CN} \rightleftharpoons [\text{Cu(P-P)(CH}_3\text{CN)}_n]^+\text{hfac}^-. $$

While the complexes are not luminescent the ion pairs [Cu(P-P)(CH$_3$CN)$_n$]$^+$hfac$^-$ are emissive at 77 K. The cations and the anions show separate emissions as indicated by the excitation spectra.

**Key words:** Electronic Spectra, Luminescence, Copper Complexes, β-Diketonate Complexes