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**Synthesis and structural characterization of ferrocene phosphines modified with polar pendants and their palladium(II) complexes. Part II: *N*-aminocarbonyl and *N*-acyl phosphinoferrocene carbohydrazides**

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**Abstract.** The reactions of 1'-(diphenylphosphino)-1-(hydrazinylcarbonyl)ferrocene,  $\text{Ph}_2\text{PfcCONHNH}_2$  (**1**; fc = ferrocene-1,1'-diyl), with  $\text{HNCO}$ ,  $\text{EtNCO}$ ,  $\text{PhNCO}$ ,  $\text{Me}_2\text{NC(O)Cl/pyridine}$ , and  $\text{Ac}_2\text{O/NEt}_3$  produced the corresponding *N*-functionalized derivatives  $\text{Ph}_2\text{PfcCONHNHC(O)Y}$  (**1a-e**), where Y =  $\text{NH}_2$  (**a**),  $\text{NHEt}$  (**b**),  $\text{NHPh}$  (**c**),  $\text{NMe}_2$  (**d**), and  $\text{Me}$  (**e**). Compounds **1a-e** were used as ligands (L) to prepare Pd(II) bis(phosphine) complexes  $[\text{PdCl}_2(\text{L-}\kappa\text{P})_2]$  (**3a-e**) and two series of Pd(II) complexes bearing an auxiliary 2-[(dimethylamino- $\kappa\text{N}$ )methyl]phenyl- $\kappa\text{C}^1$  ( $\text{L}^{\text{NC}}$ ) ligand, namely,  $[(\text{L}^{\text{NC}})\text{PdCl}(\text{L-}\kappa\text{P})]$  (**4a-e**) and  $[(\text{L}^{\text{NC}})\text{Pd}(\text{L-}\kappa^2\text{O,P})][\text{SbF}_6]$  (**5a-e**). The crystal structures of compounds **1a**, **1c**, **1e**, the phosphine oxide of **1e** (i.e., compound **2e**), and complexes **3c**·4 $\text{CH}_2\text{Cl}_2$ ·2 $\text{CH}_3\text{OH}$ , **3e**·4 $\text{CH}_3\text{OH}$ , **4e**, and **5e**·2.5 $\text{CHCl}_3$  were determined by single-crystal X-ray diffraction analysis. Hydrogen bonding interactions observed in the solid-state structures of these compounds are discussed.

**Keywords:** Ferrocene ligands; Phosphines; Hydrazides; Ureas; Palladium complexes; Structure elucidation.

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