

The reaction of 1'-(diphenylphosphino)-1-ferrocenecarboxylic acid (**Hd₂pf**) with H₂NCH₂CO₂CR₃ mediated by peptide coupling agents (EDC/HOBt) afforded novel glycine phosphino-carboxamides Ph₂PfcCONHCH₂CO₂CR₃ (fc = ferrocene-1,1'-diyl; R = H (**2**) and Me (**3***)). Compound **2** was converted to its corresponding phosphine oxide (**5***) and sulfide (**6***), to *N*-acyl glycine Ph₂PfcCONHCH₂CO₂H (**7**), and to bis-amide Ph₂PfcCONHCH₂CONH₂ (**8***). Compounds **2** and **8** reacted with [PdCl₂(cod)] (cod = η²:η²-cycloocta-1,5-diene) and **7** reacted with Na₂[PdCl₄] to afford the respective, mostly solvated bis-phosphine complexes *trans*-[PdCl₂(L-κ*P*)₂] (**9**: L = **2**; **10**: L = **7**, **11**: L = **8**). Furthermore, bridge cleavage reaction of [{Pd(μ-Cl)(L^{NC})₂}] (L^{NC} = 2-[(dimethylamino-κ*N*)methyl]phenyl-κ*C*¹) (**12**) with **2** gave [(L^{NC})Pd(Cl)(**2**-κ*P*)] (**13***), which was further reacted with AgClO₄ or KO*t*-Bu to afford bis-chelate complexes [(L^{NC})Pd(**2**-κ²*O,P*)]ClO₄ (**14***) and [(L^{NC})Pd(L-κ²*N,P*)] (**15***; L = **2** deprotonated at the NH group), respectively. All compounds were characterized by spectroscopic methods (multinuclear NMR, MS, and IR) and by elemental analyses; the asterisk indicates that the crystal structure has been determined. Phosphine **7** in combination with palladium(II) acetate were shown to be highly active catalysts for the Suzuki-Miyaura cross-coupling of aryl bromides with phenylboronic acid in polar solvents (ethanol and dioxane), in their aqueous mixtures, and in pure water.