Methoxycarbonylation of styrene catalyzed by palladium complexes with ferrocene derivatives containing nitrogen and phosphine ligands

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The catalytic behaviour of different complexes of Palladium(II) containing mono or bidentate phosphorus or nitrogen ligands in the methoxycarbonylation reaction is examined. The pre-catalysts containing either a diphosphine ligand possessing a ferrocenyl backbone or a naphthyridine ligand attached to the same ferrocenyl backbone showed different catalytic activity for the reaction. Complexes containing the 1,1-bis(diphenylphosphino)ferrocene (dppf) ligand showed a better catalytic activity than the complex having the naphthyridine ligand in its structure. Various effects of the addition of triphenylphosphine to these pre-catalysts were observed. More than 99% conversion was achieved in the methoxycarbonylation of styrene using Pd(II) catalysts with ferrocenyl chelate derivatives, mostly with the Pd(dppf)Cl2, [Pd(dppf)(MeCN)2](BF4)2 and [Pd(dppf)PPh 3](BF4)2 complexes without the presence of triphenylphosphine as is usual in this reaction. The reactions were carried out under mild press