ABSTRACT

Perfluoroalkyl-substituted Phosphines:

Synthesis, Coordination to Metals and Roles in Catalysis

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The synthesis of a range of perfluoroalkyl-substituted phosphines [*i.e.* $P(C_nF_{2n+1})_3$ (n = 1, 2, 3, 4, 6) and $Ph_{3-m}P(C_nF_{2n+1})_m$ (n = 1, 2; m = 1, 2)] has been optimised. The new phosphine, heptafluoroisopropylphosphine ($Ph_2P^iC_3F_7$), has been synthesised and fully characterised by analysis and X-ray diffraction. Novel metal complexes of several of the perfluoroalkylphosphines have been obtained, notably $[\{Rh(\mu\text{-}Cl)(PPh_2PCF_3)_2\}_2]$ and *trans*-$[PtCl_2\{P(^iC_3F_7)Ph_2\}_2]$. Rhodium(I) complexes of some perfluoroalkylphosphines were screened for catalytic activity in the *ortho*-arylation of phenols and [5+2] cycloaddition reactions.

Keywords: perfluoroalkyl; phosphine; organometallic; homogeneous catalysis