

STABILITY OF DIFLUOROPHOSPHINES AND THEIR PLATINUM COMPLEXES

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Compounds involving carbon-bonded $\lambda^3\text{P-F}$ are normally unstable because of redox disproportionation, e.g.: $2n \text{RPF}_2 \longrightarrow 1/n (\text{RP})_n + n \text{RPF}_4$.

This type of reactions is fairly slow if sterically demanding organic groups (e.g. *tert*-butyl) or strongly electronegative groups (e.g. CF_3) are used. The reaction of organolithium compounds (RLi) with PF_2Cl [1,2] [$\text{RLi} + \text{PF}_2\text{Cl} \longrightarrow \text{RPF}_2 + \text{LiCl}$] therefore provides a mild method of preparing difluorophosphines of the type RPF_2 (R = organic substituent). With anthracyl lithium we observed the formation of anthracyl difluorophosphine, which dimerized on irradiation. The anthracyl difluorophosphine monomer and dimer are stable with respect to redox disproportionation and the dimer is also moderately air stable; it was characterized by an X-ray diffraction study. The partial hydrolysis of the PF_2 -group gave compounds of type $\text{RP}(\text{F})(\text{O})(\text{H})$. In the case of R = 2,6-diphenoxyphenyl the corresponding fluorophosphonic acid was characterized by n.m.r. spectra and by an X-ray diffraction study.

Organodifluorophosphines reacted with *cis*-dichloro(η^4 -1,5-cyclooctadiene)platinum(II) or K_2PtCl_4 to form *cis*-dichloro-bis(organodifluorophosphine)platinum(II) or tetrakis(organodifluorophosphine)platinum(0), respectively. These complexes were characterized by n.m.r. spectra and by X-ray diffraction studies for R = Bu^t , Me_5C_5 [2]. For complexes involving PF_2 -groups, a correlation between the Pt-P bond length and $^2\text{J}(\text{PtF})$ was found.

The tetrakis(aryldifluorophosphine)platinum(0) complexes were found to undergo hydrolysis of the PF_2 -group and oxidation of the platinum with formation of bis(arylphosphonofluoridate)-bis(arylphosphonofluoridous acid)platinum(II). Bis{bis(2,5-dimethylphenylfluorophosphinito)-difluoroborato}platinum(II) is the only product of the reaction of the appropriate $\{\text{RPF}(\text{O})\}_2\text{Pt}\{\text{RPF}(\text{OH})\}_2$ complex with $\text{BF}_3 \cdot \text{Et}_2\text{O}$ and was characterized by a single crystal X-ray diffraction study.

1 L.Heuer and R.Schmutzler. *J.Fluorine Chem.* **39** (1988) 197.

2 L.Heuer, *Dissertation*, Technische Universität Braunschweig, 1989.