

## Abstract

This thesis focuses on the synthesis and characterisation of coordination compounds of palladium and platinum with polyfluoroaryl ligands. These compounds are of the type  $[(D^{\wedge}D)M(L)R]$  and  $[(D)_2M(L)R]$  (D = donating atom e.g. C, N, P; M = Pt, Pd; L = Cl, fluoroaryle, R = Cl, fluoroaryle), in which fluorinated ligands such as polyfluorophenylate, tetrafluorothiolate and pentafluorophenylate are coordinated via metathesis reactions. Various co-ligands were used and their individual influences in terms of different properties of the products were investigated. The compounds are characterised by NMR- and IR-spectroscopy, mass-spectrometry and structural determination by X-ray measurements on single crystals. Various reactions with tetrafluorophenylate ligands have been investigated. Remarkably the reaction of  $[(cod)PtCl_2]$  with tetrafluorophenolate led to the expected major products  $[(cod)Pt(OC_6F_4H)Cl]$  and  $[(cod)Pt(OC_6F_4H)_2]$  featuring a Pt—O-coordination mode as well as unprecedented platinated minor products. In the latter compounds of the formula  $[(cod)PtCl(C_6F_4OH)]$  and respectively  $[(cod)Pt(C_6F_4OH)_2]$ , the tetrafluorophenol-ligands are bounded via a Pt—C-coordination mode. This extraordinary platination mechanism was examined by variation of the reaction conditions, the ligands and precursor compounds. In addition, the synthesised compounds with a tetrafluorothiolate ligand are discussed. In these compounds the ligand binds solely in the Pt—S-coordination mode and terminally, that is in contrast to the tendency of coordinating in bridging modes. Only in  $[(phen)_3K][{(SC_6F_4H)_2Pd-\{\mu-(SC_6F_4H)_2\}Pd(SC_6F_4H)_2}]$  the bridging mode is observed. Since this interesting reaction behaviour of tetrafluorophenolate and tetrafluorothiolate towards precursor compounds was observed, the reactivity of these ligands to copper(II)nitrate, as an example for a different metal compound, was investigated. In the reaction with tetrafluorophenole, an *in situ* nitration of the ligand in the *para*-position was observed and this mechanism was investigated. Finally, the mechanism of the platination reaction was postulated in consideration of all reactions with various ligands and precursor compounds.

Moreover compounds with pentafluorophenyl ligands were synthesised and probed in cytotoxicity tests regarding their antiproliferative impact. Furthermore, compounds consisting of tetrafluorothiolate ligands were tested for the first time in respect of their cytotoxicity. Some of those show good activity similar to *Cisplatin* and the obtained data afforded indication for designing of new compounds.