

6. Summary

The behaviour of covalent teflate compounds of metals versus xenon was investigated. $\text{Tl}(\text{OTeF}_5)_3$, $\text{Pt}(\text{OTeF}_5)_2$ and $\text{Ir}(\text{OTeF}_5)_3$ were tried to be synthesized and characterized by x-ray crystallography. Only $\text{Tl}(\text{OTeF}_5)_3$ was successfully synthesized and characterized.

In case of $[\text{Tl}(\text{OTeF}_5)_3 \cdot 2 \text{SO}_2\text{ClF}]_2$ the first covalent maingroup-compound with bridged teflate-groups could be isolated and investigated by x-ray crystallography. There are only three other compounds of transitionmetals, e.g. $\text{Au}(\text{OTeF}_5)_3$ ^[16], where a bridged teflategroup exist.

The known compounds $\text{Au}(\text{OTeF}_5)_3$ ^[16], $\text{Fe}(\text{OTeF}_5)_3$ ^[17] as well as $\text{Tl}(\text{OTeF}_5)_3$ did not form a coordination compound with liquid xenon. We can therefore assume that the basicity of xenon within chosen conditions is not high enough to form a stable compound. Ab-initio-calculations by Seppelt^[77] showed that $\text{Tl}(\text{OTeF}_5)_2^+$ or $\text{Tl}(\text{OTeF}_5)^{2+}$ should be able to coordinate xenon. The synthesis and crystallographic analysis of the cationic thallium(III)-teflate compounds and their reaction with xenon needs to be the focus of further research.

During the attempt to synthesize $\text{Pt}(\text{OTeF}_5)_2$, the two side products $\text{CH}_3\text{C}(\text{NH})\text{OTeF}_5$ and $\text{C}_2\text{H}_5\text{C}(\text{NH})\text{OTeF}_5$ have been obtained. With those the first carbon-teflate compounds are accomplished that are crystallographically determined.

Another emphasis of this dissertation was the synthesis of main group-compounds with the ligands NHTeF_5 , and their x-ray crystallographic and NMR characterisation. In the following table the compounds of the 5th and 6th maingroup are summarized. To differentiate the compounds synthesized during this research are written in black whereas the already known compounds are grey.

Group 5	Group 6
$F_3P=NTeF_5$ [5]	$OS=NTeF_5$ [5]
$Cl_3P=NTeF_5$ [5]	$F_5TeN=S=NTeF_5$ [10]
$AsF_5 \cdot H_2NTeF_5$ [3]	$F_2S=NTeF_5$ [5]
$As(NHTeF_5)F_4$	$F_5SN(CF_3)TeF_5$ [6]
$As(NHTeF_5)_2F_3$	$O=F_2S=NTeF_5$ [5]
$As(NHTeF_5)_x F_{(3-x)}$	$Cl_2S=NTeF_5$ [5]
$Sb(NHTeF_5)_2F_3$	$F_2Se=NTeF_5$ [5]
	$Cl_2Se=NTeF_5$ [5]
	$Te(NHTeF_5)_2F_2$

The attempts to obtain $E(NHTeF_5)_5$ with $E = As, Sb, I$ has been only successful in part. In the case of arsenic, $As(NHTeF_5)F_4$ was ^{19}F -NMR-spectrographically, and $As(NHTeF_5)_2F_3$ crystallographically characterized. In the case of antimony $Sb(NHTeF_5)_2F_3$ was ^{19}F -NMR-spectrographically characterized. The synthesis and ^{19}F -NMR characterisation of compounds of the type $I(NHTeF_5)_{5-x}F_x$ with $x = 1-5$ are further challenge.

$As(NHTeF_5)_x F_{(3-x)}$ with $x = 1-3$ is so far the only known trivalent compound with the $NHTeF_5$ ligand.

During the attempts to obtain $X_2Te=NTeF_5$, with $X = F, Cl$, $Te(NHTeF_5)_2F_2$ and $TeCl_2F_2 \cdot 2 THF$ was discovered. $TeCl_2F_2$ is the first crystallographic determined mixed tellurium tetrahalogenid.

In accordance with the VSEPR-theory the $NHTeF_5$ ligand assumes the equatorial position as a more electro-positive ligand in the trigonal-bipyramidal $As(NHTeF_5)_2F_3$. NMR investigations confirmed the lesser group electronegativity of the $NHTeF_5$ ligand as compared to fluorine or $OTeF_5$.