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PRELIMINARY NOTE

Organotellurium(VI) Fluorides

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SUMMARY

A series of phenyltellurium(VI) fluorides have been prepared by the oxidative-fluorination of tellurium compounds with xenon difluoride. The compounds were characterized by elemental analysis, fluorine and tellurium nmr, and mass spectrometry.

The first perfluoroalkyltellurium(VI) halide was reported by Passmore and co-workers in 1974 [1]. We now wish to report the synthesis of a series of organotellurium(VI) fluorides, containing one to four phenyl substituents, which can be prepared by the oxidative-fluorination of Te(I), Te(II) or Te(IV) compounds with xenon difluoride.

The reactions with XeF_2 were generally carried out on a 0.5 to 1.0 mmol scale in a polytetrafluoroethylene bottle at -10 to 20°C in dichloromethane or acetonitrile solution. Some of the products were obtained in several ways: $PhTeF_5$ was prepared from $PhTeF_3$ and XeF_2 as well as from PhTeTePh and XeF_2.

$$PhTeF_3 \xrightarrow{XeF_2} PhTeF_5 \xleftarrow{XeF_2} PhTeTePh$$

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TABLE 1

NMR data and elem. anal. of some phenyltellurium(VI) fluorides[a]

Compound	δF_A	δF_B	$^2J_{F_AF_B}$	δTe	$^1J_{TeF_A}$	$^1J_{TeF_B}$	C(%) Calcd / Found	H(%) Calcd / Found
$PhTeF_5$	-37	-54	148	+711(d,q)	2955	3614		
Ph_2TeF_4	-58(s)			+805(q)	3000		40.3 41.6	2.8 3.0
Ph_3TeF_3	-8(t)	-99(d)	40	+785(d,t)	2843	2066	52.0 52.2	3.6 3.7
Ph_3TeF_2Cl	-4(d)	-88(d)	50	+778(d,d)	2580	1902	50.0 49.6	3.5 3.8
Ph_4TeF_2	-33(s)			+659(t)	2057			

[a] Negative chemical shifts are upfield from $CFCl_3$ and Me_2Te. s=singlet, d=doublet, t=triplet, q=quintet. Elemental analysis by Galbraith Laboratories, Knoxville, Tenn.

Ph_2TeF_4 was prepared from Ph_2TeF_2 and XeF_2 or from Ph_2Te and two equiv of XeF_2. Ph_3TeF_3 was obtained from the reaction of Ph_3TeF and XeF_2. The reaction of Ph_3TeCl and XeF_2 also gave Ph_3TeF_3, as well as Ph_3TeF_2Cl. Ph_4TeF_2 was prepared from Ph_4Te and XeF_2.

These phenyltellurium(VI) fluorides were characterized by elemental analysis, ^{19}F and ^{125}Te nmr (Table 1) and mass spectrometry. The nmr data establish the geometry of $PhTeF_5$ (AB_4), trans-Ph_2TeF_4, mer-Ph_3TeF_3(AB_2) and mer-Ph_3TeF_2Cl(AB). Other stereoisomers can be detected by fluorine nmr but their characterization is not complete.

The characteristic peaks in the mass spectra (based on the ^{130}Te and ^{35}Cl isotopes) are: $PhTeF_5$ 302(M), 225(M-Ph); Ph_2TeF_4 360(M), 341(M-F); Ph_3TeF_3 399(M-F), 341(M-Ph); Ph_3TeF_2Cl 415 (M-F), 399(M-Cl), 357(M-Ph); Ph_4TeF_2 457(M-F).

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1 C. D. Desjardins, C. Lau and J. Passmore, Inorg. Nucl. Chem. Lett., 10 (1974) 151.