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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 .

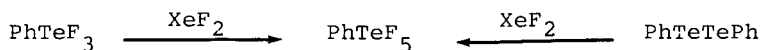


TABLE 1

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

Compound	δ_{F_A}	δ_{F_B}	$^2J_{F_A F_B}$	δ_{Te}	$^1J_{TeF_A}$	$^1J_{TeF_B}$	C(%)		H(%)	
							Calcd	Found	Calcd	Found
PhTeF ₅	-37	-54	148	+711(d,q)	2955	3614				
Ph ₂ TeF ₄	-58(s)			+805(q)	3000		40.3		2.8	
							41.6		3.0	
Ph ₃ TeF ₃	-8(t)	-99(d)	40	+785(d,t)	2843	2066	52.0		3.6	
							52.2		3.7	
Ph ₃ TeF ₂ Cl	-4(d)	-88(d)	50	+778(d,d)	2580	1902	50.0		3.5	
							49.6		3.8	
Ph ₄ TeF ₂	-33(s)			+659(t)	2057					

^a Negative chemical shifts are upfield from CFCl₃ and Me₂Te.
s=singlet, d=doublet, t=triplet, q=quintet. Elemental analysis by Galbraith Laboratories, Knoxville, Tenn.

Ph₂TeF₄ was prepared from Ph₂TeF₂ and XeF₂ or from Ph₂Te and two equiv of XeF₂. Ph₃TeF₃ was obtained from the reaction of Ph₃TeF and XeF₂. The reaction of Ph₃TeCl and XeF₂ also gave Ph₃TeF₃, as well as Ph₃TeF₂Cl. Ph₄TeF₂ was prepared from Ph₄Te and XeF₂.

These phenyltellurium(VI) fluorides were characterized by elemental analysis, ¹⁹F and ¹²⁵Te nmr (Table 1) and mass spectrometry. The nmr data establish the geometry of PhTeF₅ (AB₄), trans-Ph₂TeF₄, mer-Ph₃TeF₃ (AB₂) and mer-Ph₃TeF₂Cl (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 ¹³⁰Te and ³⁵Cl isotopes) are: PhTeF₅ 302(M), 225(M-Ph); Ph₂TeF₄ 360(M), 341(M-F); Ph₃TeF₃ 399(M-F), 341(M-Ph); Ph₃TeF₂Cl 415 (M-F), 399(M-Cl), 357(M-Ph); Ph₄TeF₂ 457(M-F).

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